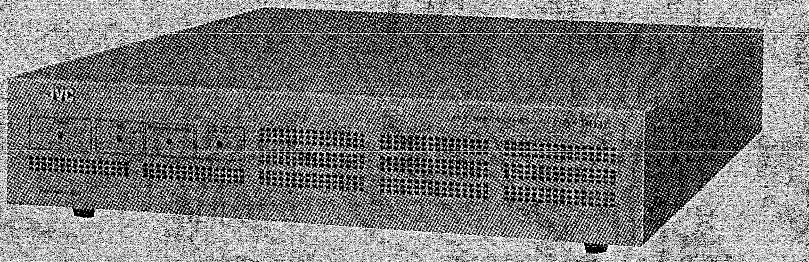
JVC

SERVICE MANUAL

TIME BASE CORRECTOR

SA-T411E



SPECIFICATIONS

GENERAL
AC power requirement: AC 102–127 V or 220–240 V,
50/60 Hz
Power consumption : 65 W
Operating temperature: +5 to 40°C
Operating humidity : 10 to 90 %
Dimensions : 430(W) x 88(H) x 515(D) mm
Weight : Approx. 12 kg

VIDEO
Signal process : Component (Y, R-Y, B-Y = 4:2:2)
Time-base correction range : Infinite (1 frame/2 fields)
Sampling frequency : Y: 13.5 MHz
C: 6.75 MHz (4:2:2 format)
Sampling rate : Y: 8-bit
C: 8-bit
Frequency response : Y: 500 kHz to 5 MHz +0.5 dB/−3 dB
C: 4.43 MHz ±0.5 MHz −3 dB
Signal-to-noise ratio : 56 dB p-p/rms without quanting effects
(SC trap on; with Shibasoku noise meter)
DG (APL 50 %) : 2 %
DP (APL 50 %) : 2°
K factor (2T) : 2 %
H tilt : 2 % (Composite mode)
V tilt : 1 % (Y input & output)
Jitter : Y: ±15 nsec
C: ±2°
Freeze : Frame/field (A/B) selectable
Auto freeze : Bad video sensor (on/off)
Vertical blanking : On/off selectable

INPUT SIGNAL
Video input
Composite : 1.0 Vp-p, 75 ohms
Y/C 443 : Y: 1.0 Vp-p, 75 ohms
C: 0.3 Vp-p, 75 ohms (Burst)
Reference input : 1.0 Vp-p (VBS), 0.45 Vp-p (BB)
75 ohms
RF (DOC) input : 0.2 to 1.0 Vp-p 75 ohms

OUTPUT SIGNAL
Video output
Composite : 1.0 Vp-p, 75 ohms
Y/C 443 : Y: 1.0 Vp-p, 75 ohms
C: 0.3 Vp-p, 75 ohms (Burst)
Component Y: 1.0 Vp-p, 75 ohms (100 % colour bar)
R-Y/B-Y: 0.7 Vp-p, 75 ohms (100 % colour bar)
Advanced sync output: 4.0 Vp-p, 75 ohms

ACCESSORIES : Rack mount kit

Design and specifications subject to change without notice.

No. 9192
May 1990

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TABLE OF CONTENTS

Section Title Page

Important Safety Precautions

Instructions

1. DISASSEMBLY
- 1.1 REMOVING EXTERNAL COVERS 1- 1
  - 1.1.1 Top cover 1- 1
  - 1.1.2 Front panel 1- 1
  - 1.1.3 Rear panel 1- 1
- 1.2 REMOVING THE FUSE 1- 1
- 1.3 REMOVING MAIN BOARDS 1- 2
  - 1.3.1 PROCESS board 1- 2
  - 1.3.2 DIGITAL board 1- 2
  - 1.3.3 NR board 1- 2
- 1.4 6-PIN REMOTE IN CONNECTOR 1- 3
- 1.5 INTERNAL SWITCHES 1- 3
  - 1.5.1 NR board 1- 3
  - 1.5.2 PROCESS board 1- 4
  - 1.5.3 DIGITAL board 1- 6

2. ELECTRICAL ADJUSTMENTS
- 2.1 DESCRIPTION OF SECTION 2- 1
- 2.2 MEASURING INSTRUMENTS 2- 1
- 2.3 CHECK POINTS 2- 2
  - 2.3.1 Power supply unit 2- 2
  - 2.3.2 Processor board 2- 2
  - 2.3.3 Digital card 2- 5
- 2.4 ADJUSTMENT PROCEDURE 2- 6
  - 2.4.1 Control setting 2- 6
  - 2.4.2 Adjustment modes 2- 7
  - 2.4.3 Power supply 2- 8
  - 2.4.4 Process board 2- 8
  - 2.4.5 Digital board 2-19
  - 2.4.6 Noise reducer circuit 2-23

3. CIRCUIT DESCRIPTION
- 3.1 PROCESSOR CARD 3- 1
  - 3.1.1 Input process 3- 1
  - 3.1.2 Output process 3- 3
- 3.2 DIGITAL CARD 3- 4
  - 3.2.1 Dropput compensation circuit 3- 5
  - 3.2.2 Write memory control circuit 3- 5
  - 3.2.3 Memory circuit 3- 5
  - 3.2.4 Read memory control circuit 3- 6
  - 3.2.5 Read data circuit 3- 6
  - 3.2.6 Genlock circuit 3- 7
  - 3.2.7 Control circuit 3- 7

Section Title Page

4. DIAGRAMS AND CIRCUIT BOARDS
- 4.1 CIRCUIT BOARD LOCATIONS 4- 1
- 4.2 PRECAUTIONS TO BE TAKEN WITH CIRCUIT DIAGRAMS 4- 2
  - 4.2.1 Connector indication 4- 2
  - 4.2.2 Indication of wire connections on the same board 4- 2
  - 4.2.3 Connector connections 4- 2
  - 4.2.4 The following rules apply to circuit diagrams unless otherwise specified 4- 2
- 4.3 OVERALL WIRING DIAGRAM 4- 3
- 4.4 PROCESS BLOCK DIAGRAM 4- 4
- 4.5 DIGITAL BLOCK DIAGRAM 4- 6
- 4.6 NOISE REDUCER BLOCK DIAGRAM 4-14
- 4.7 POWER SUPPLY SCHEMATIC DIAGRAM 4-15
- 4.8 REGULATOR SCHEMATIC DIAGRAM 4-16
- 4.9 REGULATOR CIRCUIT BOARD 4-17
- 4.10 PROCESS SCHEMATIC DIAGRAM 4-18
- 4.11 DIGITAL SCHEMATIC DIAGRAM 4-27
- 4.12 PROCESS CIRCUIT BOARD 4-38
- 4.13 DIGITAL CIRCUIT BOARD 4-39
- 4.14 NOISE REDUCER SCHEMATIC DIAGRAM 4-40
- 4.15 NOISE REDUCER CIRCUIT BOARD 4-44
- 4.16 Y CLAMP SCHEMATIC DIAGRAM 4-45
- 4.17 Y CLAMP CIRCUIT BOARD 4-46
- 4.18 IC BLOCK DIAGRAM 4-47

5. EXPLODED VIEWS AND PARTS LIST
- 5.1 STANDARD PART NUMBER CODING 5- 2
  - 5.1.1 Screw coding 5- 2
  - 5.1.2 Fuse coding 5- 3
- 5.2 EXPLODED VIEWS AND PARTS LIST 5- 4
  - 5.2.1 Chassis assembly 5- 4
  - 5.2.2 Packing assembly 5- 6

6. ELECTRICAL PARTS LIST
- 6.1 STANDARD PART NUMBER CODING 6- 2
  - 6.1.1 Fixed resistor coding 6- 2
  - 6.1.2 Fixed capacitor coding 6- 3
- 6.2 ELECTRICAL PARTS LIST 6- 5
  - REGULATOR BOARD ASSEMBLY <01> 6- 5
  - NOISE REDUCER BOARD ASSEMBLY <07> 6- 5
  - Y CLAMP BOARD ASSEMBLY <08> 6- 8
  - PROCESSOR BOARD ASSEMBLY <03> 6-10
  - DIGITAL BOARD ASSEMBLY <05> 6-15

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:

1) Insulation Tape	3) Spacers	5) Barrier
2) PVC tubing	4) Insulation sheets for transistors	

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

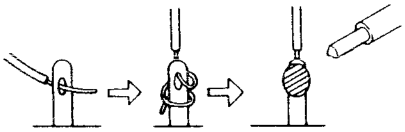


Fig. 1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

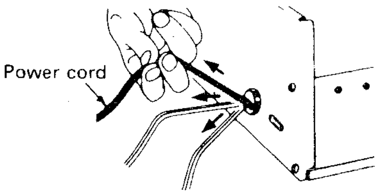


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

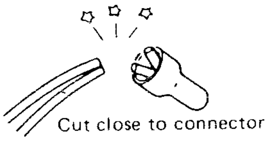


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

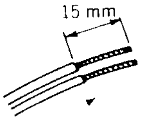


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

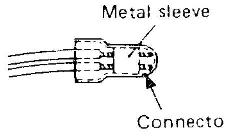


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

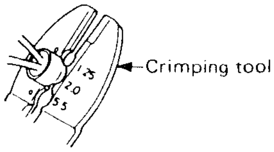


Fig. 6

(5) Check the four points noted in Fig. 7.

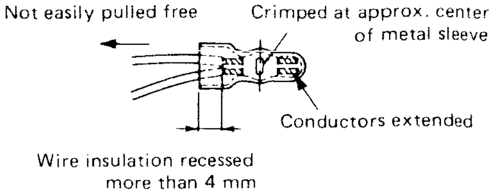

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

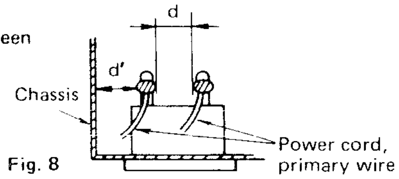


Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
   Measuring Method: (Power ON)
   Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

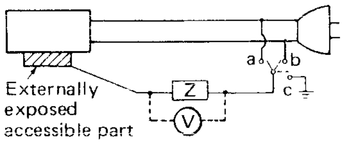


Fig. 9

5. **Grounding (Class I model only)**
   Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
   Measuring Method:
   Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

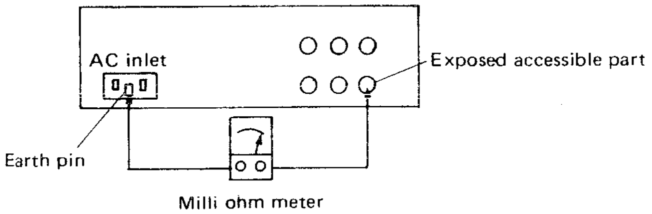


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	—	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

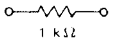
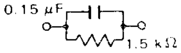
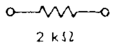
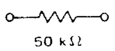
AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	 1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	 0.15 μF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	 2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		 50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

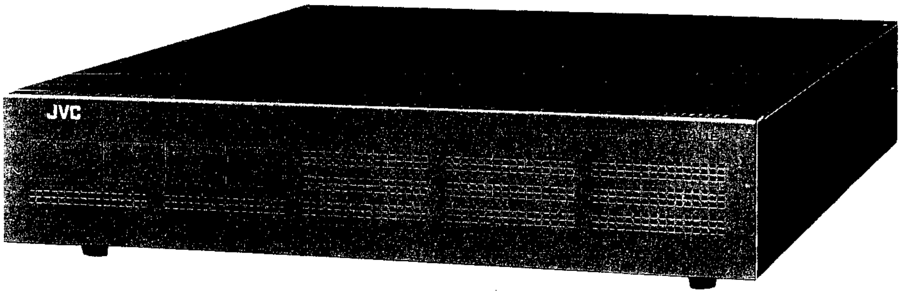
Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

JVC

SA-T411E

TIME BASE CORRECTOR
CORRECTEUR DE BASE DE TEMPS
ZEITFEHLERAUSGLEICHER



PGD30002-170

WARNING:
DANGEROUS VOLTAGE INSIDE.
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

Warning Notice
FOR YOUR SAFETY (Australia)

1. Insert this plug only into an effectively earthed three-pin power outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cords, if used, must be three-core and correctly wired.

WARNING-THIS APPLIANCE MUST BE EARTHED
IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

GREEN-and-YELLOW: EARTH
BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-and-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth symbol or coloured GREEN or GREEN-and-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or which is coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

POWER SYSTEM

Connection to the mains supply

The operating voltage of this set is preset to 220-240 V at the factory.

Before connecting to mains, check that the voltage selector on the rear panel is set to the same voltage as your local mains supply.

Adapting the local power line

This set operates on either 220-240 V or 102-127 V∿. If the preset voltage is different from the power line voltage in your area, reset the voltage selector by inserting a screwdriver into the slot of the voltage selector.

CAUTION

To prevent electric shock, do not open the cabinet. No user-serviceable parts inside. Refer servicing to qualified service personnel.

CAUTION: For continued protection against fire hazard, replace only with same type and rated fuse(s). Refer replacement to qualified service personnel.
PG040108

NOTE:
The rating plate (serial number plate) is on the bottom of the unit.

This unit is produced to comply with Directives 76/889/EEC, 82/499/EEC and 87/308/EEC.

CONTENTS

Precautions 2
Features 2
Controls and Connectors
Front panel 3
Inside front panel 3
Rear panel 5
Connections 6
Specifications 9

PRECAUTIONS

Safety Precautions

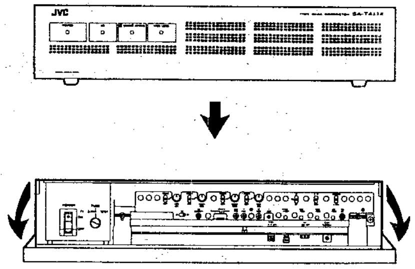
- Use only the power source specified.
- Pay attention not to damage the power cord to prevent fire or shock hazards.
- Pay attention not to allow foreign objects including water, metal and inflammable objects to enter the unit through the ventilation holes, etc. to prevent malfunctions.
- Disconnect the power plug when the unit is not to be used for a long period of time.
- When there is an abnormality, for example a strange odor or smoke, immediately disconnect the power cord and consult your dealer or JVC-authorized service agent.

Handling and Storage

- Avoid using the unit under the following conditions:
  - in extremely hot or cold places,
  - in extremely humid places,
  - near appliances generating strong magnetic fields,
  - in dusty places,
  - in places subject to vibrations, and
  - when it has been moved between places with a large temperature difference.
- Handle the unit carefully.
  - Do not block the ventilation openings on the top and rear panels or place anything heavy on the unit.
  - Avoid applying violent shocks to the unit during transportion.

Maintenance and Cleaning

- The unit is precision-built for a high performance, and requires periodical maintenance and cleaning for an extended service life. However, as parts replacement and/or adjustment require very sophisticated techniques and equipment, consult your nearest JVC-authorized service agent.



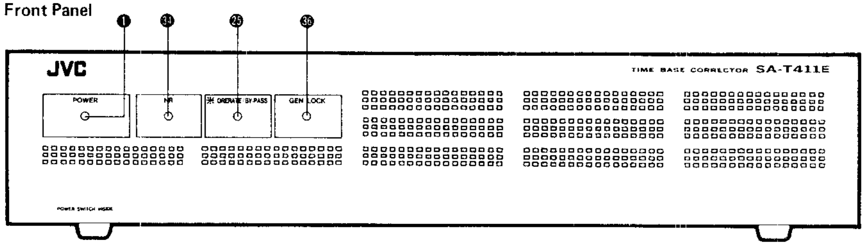
Note: Pull the front panel towards you to open it.

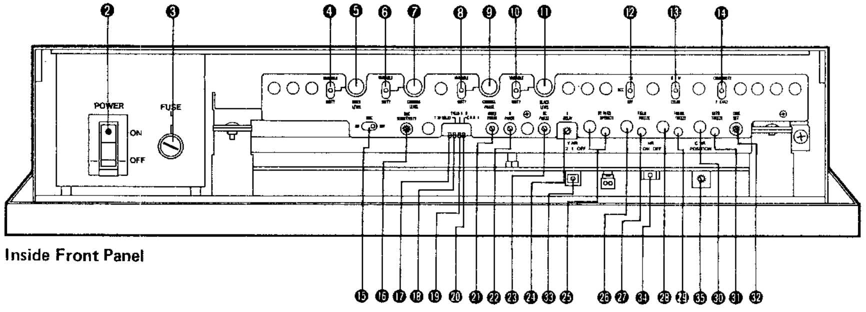
FEATURES

- High picture quality thanks to the component signal processing system with a sampling rate of 4:2:2 and an 8-bit quantization for each of the Y and C signals. High resolution through use of a wide-band CCD comb filter.
- Simple and dependable connections at input and output of the Y/C separate signals with 7-pin connectors conforming to the YC 443 system.
- Built-in frame memory allowing a wide range of compensation over two fields.
- DOC provided as standard for production of high-quality video images.
- Y signal digital delay line allows the Y/C delay to be adjusted in 16 steps of 75 ns.
- Built-in ACC (Automatic Chroma Level Control) with on/off switch.
- Built-in black stretch circuit with on/off switch.
- Both frame freeze and field freeze (with field selection) are possible either manually or automatically.
- Optional remote control unit.
- Built-in Y and C noise reduction for improved multi-generation dubbing.

CONTROLS AND CONNECTORS

Front Panel





Inside Front Panel

① POWER indicator
② POWER switch
③ FUSE holder
④ VIDEO LEVEL VARIABLE/UNITY select switch

VARIABLE: Enables adjustment using the VIDEO LEVEL control ⑤.

UNITY: The video level of the output signal is equal to the input signal regardless of the position of the VIDEO LEVEL control ⑤.

⑤ VIDEO LEVEL control

When the VIDEO LEVEL VARIABLE/UNITY select switch ④ is set to "VARIABLE", the video level of the output signal can be adjusted within ±3 dB. The video level of the input and output signals is equal when the white marker of this control is positioned at the upper centre.

⑥ CHROMA LEVEL VARIABLE/UNITY select switch

VARIABLE: Enables adjustment using the CHROMA LEVEL control ⑦.

UNITY: The chroma level of the output signal is equal to the input signal regardless of the position of the CHROMA LEVEL control ⑦.

⑦ CHROMA LEVEL control

When the CHROMA LEVEL VARIABLE/UNITY select switch ⑥ is set to "VARIABLE", the chroma level of the output signal can be adjusted within ±3 dB. The chroma level of the input and output signals is equal when the white marker of this control is positioned at the upper centre.

⑧ CHROMA PHASE VARIABLE/UNITY select switch

VARIABLE: Enables adjustment using the CHROMA PHASE control ⑨.

UNITY: The chroma phase of the output signal is equal to the input signal regardless of the position of the CHROMA PHASE control ⑨.

⑨ CHROMA PHASE control

When the CHROMA PHASE VARIABLE/UNITY select switch ⑧ is set to "VARIABLE", the chroma phase of the output signal can be adjusted within ±30° with reference to the UNITY level.

⑩ BLACK LEVEL VARIABLE/UNITY switch

VARIABLE: Enables adjustment using BLACK LEVEL control ⑪.

UNITY: The black level of the input signal is fixed regardless of the position of CHROMA LEVEL control ⑪.

⑪ BLACK LEVEL control

When VARIABLE/UNITY switch ⑩ is set to "VARIABLE", the black level of the input signal can be adjusted by ±100 mV. However, the black level cannot be adjusted to below 0 V.

⑫ ACC ON/OFF switch

Set to ON to activate the built-in ACC (Automatic Chroma Level Control); the chroma level of the video signal output from the SA-T411E will be automatically adjusted with reference to the burst signal of the input video signal. Then the chroma level can be adjusted with the CHROMA LEVEL control ⑦ and the luminance level can be adjusted with the VIDEO LEVEL control ⑤, without varying the reference chroma level.

⑬ B-W/COLOUR mode select switch

B/W: The input signal is processed as a black-and-white signal (without chroma and burst signals) regardless of whether it is black-and-white or colour.

COLOUR: The input signal is processed as a colour signal regardless of whether it is black-and-white or colour. The burst signal is added to the output signal even when the input signal is monochrome.

⑭ COMPOSITE/Y/C 443 input select switch

Selects the video input signal applied to the VIDEO INPUT COMPOSITE or Y/C 443 connector.

⑮ DOC ON/OFF switch

ON: Press to use the TBC's dropout compensator (DOC).

OFF: Press to use the VTR's DOC.

⑯ DOC SENSITIVITY LEVEL control

The DOC sensor level can be adjusted when the DOC switch is set to ON. Turning this control clockwise increases the sensitivity.

⑰ AUTO FREEZE ON/OFF switch

In the ON position (up), the output video signal freezes automatically when the input video signal is interrupted.

⑱ Y 1H delay switch

In the ON position (up), the Y signal only is delayed by 1H. Normally set this switch to OFF.

⑲ FIELD A/B select switch

Selects one of the two field signals in the memory which is to be output.

⑳ CNR-1 switch

ON (up): Press to use the line chroma noise reduction system.

OFF (down): Press to use only the field noise reduction system.

㉑ VIDEO PHASE control

The phase of the video signal output from the SA-T411E can be varied continuously over a range of ±1.5 μsec. Designed as a multi-rotation type, this control makes a maximum of 15 rotations.

㉒ H PHASE control

The horizontal phase of the video signal output from the SA-T411E can be varied continuously over a range of ±3 μsec from that of the reference input signal. Designed as a multi-rotation type, this control makes a maximum of 15 rotations. When the input is switched from Y/C 443 to COMPOSITE or vice versa, the horizontal phase must be re-adjusted.

㉓ SC PHASE control

The subcarrier phase of the video signal output from the SA-T411E can be varied continuously over a range of ±180° from that of the reference input signal (in the Genlock mode). Designed as a multi-rotation type, this control makes a maximum of 15 rotations.

㉔ Y DELAY control

Controls the delay of the Y signal in 16 steps; each step corresponds to 75 ns.

㉕ BY-PASS/OPERATE switch/LED

Press to engage the OPERATE mode. In the OPERATE mode, the time-base corrected video signal will be output. The indicator will light when the BY-PASS/OPERATE switch is set to "OPERATE". In the BY-PASS mode, the indicator is off.

㉖ FIELD FREEZE indicator

Lights in the Field Freeze mode.

㉗ FIELD FREEZE button

Press for field freeze operation. Pressing again will release the field freeze.

㉘ FRAME FREEZE indicator

Lights in the Frame Freeze mode.

㉙ FRAME FREEZE button

Press for frame freeze operation. Pressing again will release the frame freeze.

㉚ STROBE FREEZE indicator

Lights in the Strobe Freeze mode

㉛ Strobe freeze/manual freeze switch

Strobe freeze: When the FRAME FREEZE or FIELD FREEZE button on the front panel is ON, the freeze and normal pictures alternate with the timing set by the TIME SET control ㉜.

Manual freeze: The freeze condition is maintained as long as the field or frame freeze mode is selected.

㉜ TIME SET control

The freeze duration in the strobe freeze mode can be adjusted.

㉝ Y (luminance signal) NR switch

0: OFF

1: Set to this position to activate the noise reduction for high frequency components of the luminance signal.

2: Set to this position to activate the noise reduction for both high and low frequency components of the luminance signal.

㉞ NR ON/OFF switch/LED

ON: Enables both luminance (Y) and chroma (C) signal noise reduction switches ㉝ and ㉟.

OFF: NO NR operation.

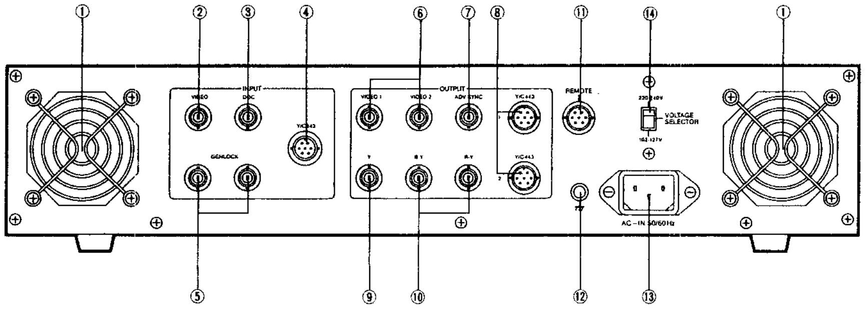
㉟ C (chroma signal) NR switch(CNR-2)

This control is a 16-step switch with which the width of the chroma signal noise reduction limiter can be varied in 15 steps. When the switch is set to the 0 position, there is no chroma noise reduction.

㊱ GENLOCK indicator

Lights when the output signal is genlocked.

Rear Panel


①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
INPUT
VIDEO
DOC
Y/C443
GENLOCK
OUTPUT
VIDEO 1
VIDEO 2
ADV SYNC
Y/C443
Y
B-Y
R-Y
REMOTE
VOLTAGE SELECTOR
AC~IN 50/60Hz

① **Fans**

② **VIDEO INPUT connector**
Connect to the video output terminal of a VCR.

③ **DOC INPUT connector**
Apply the video playback RF signal for detecting dropouts in the VCR's output.

④ **Y/C 443 INPUT connector**
Receives Y/C 443 video signals (luminance and 4.43 MHz chroma) from an S-VHS recorder via a Y/C cable (optional).

⑤ **GENLOCK REFERENCE INPUT connectors**
Apply a genlock reference signal (VBS 1 Vp-p, or black burst without APL). One of these two connectors can be used as a loop-through output. When loop-through output is not used, terminate it with 75 Ω.

⑥ **VIDEO OUTPUT connectors (1 and 2)**
The composite video signal is output via these connectors. When the BY-PASS/OPERATE select switch ● on the front panel is set to "BY-PASS" or the power is off, the signal input to the VIDEO INPUT connector ② is output as it is from the VIDEO 1 connector. When the BY-PASS/OPERATE switch ● is in the "OPERATE" position, the video signal selected with the COMPOSITE/YC 443 switch ● – either the composite signal applied to the VIDEO INPUT connector ② or the Y/C 443 signal applied to the Y/C 443 INPUT connector ④ – is output in the form of a time-base corrected composite signal from these connectors.

⑦ **ADVANCED SYNC OUTPUT connector**
A VCR which uses a capstan servo lock mechanism can be operated using this signal. For this purpose, connect the sync input terminal of the VCR to this connector.

⑧ **Y/C 443 OUTPUT connectors (1 and 2)**
The Y/C 443 signal (luminance and 4.43 MHz chroma) is output via these connectors. When the BY-PASS/OPERATE select switch ● on the front panel is set to "BY-PASS" or the power is off, the signal input to the Y/C 443 INPUT connector ④ is output as it is from the Y/C 443 OUTPUT-1 connector. When switch ● is in the "OPERATE" position, the video signal selected with the COMPOSITE/YC 443 switch ● – either the composite signal applied to the VIDEO INPUT connector ② or the Y/C 443 signal applied to the Y/C 443 INPUT connector ④ – is output in the form of a time-base corrected Y/C 443 signal from this connector.

⑨ **Y OUTPUT connector**
The time-base corrected Y (luminance) signal is output when the BY-PASS/OPERATE switch ● is set to "OPERATE". No signal is output when switch ● is in the "BY-PASS" position.

⑩ **R-Y/B-Y OUTPUT connectors**
The time-base corrected R-Y and B-Y signals are output when the BY-PASS/OPERATE switch ● is set to "OPERATE". No signal is output when switch ● is in the "BY-PASS" position.

⑪ **REMOTE connector**
Remote control is possible by connecting an optional remote control unit.
The following items can be remote-controlled:
FREEZE ON/OFF, FRAME FREEZE, FIELD FREEZE, STROBE ON/OFF.

⑫ **Ground terminal**

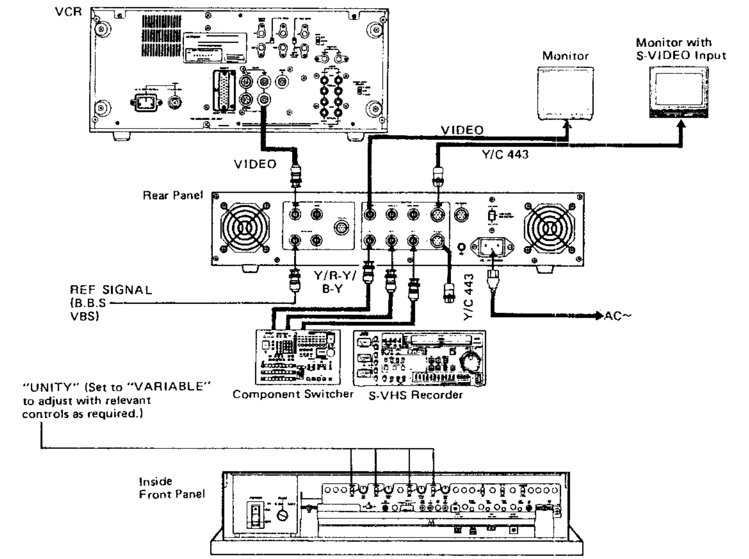
⑬ **AC input connector**

⑭ **VOLTAGE SELECTOR**

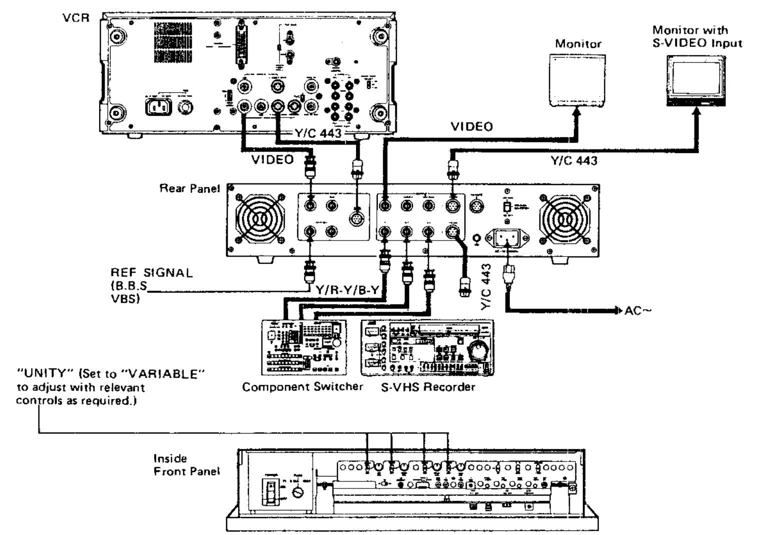
Use JVC's 6-pin cable assembly (PGZ01345) as a remoted control cable.

CONNECTIONS

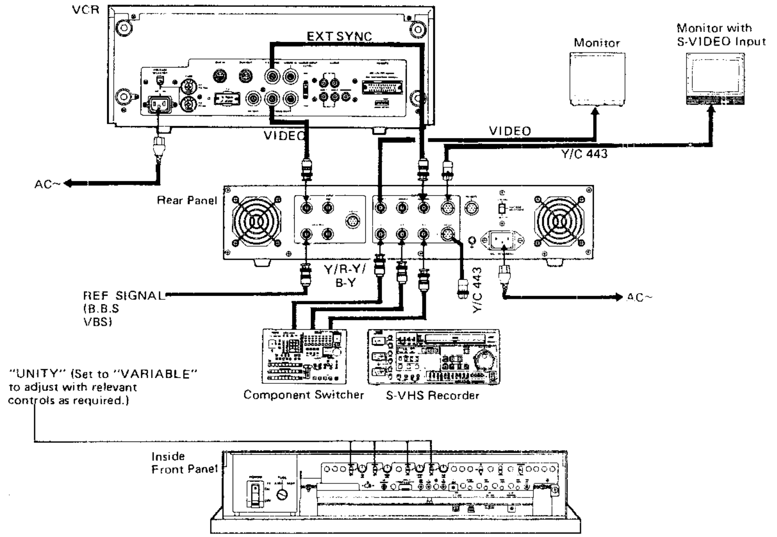
1. Connecting to a VCR not equipped with EXT SYNC input, Y/C 443 output and RF (DOC) output.


VCR
Monitor
Monitor with S-VIDEO Input
VIDEO
Y/C 443
VIDEO
Rear Panel
REF SIGNAL (B.B.S VBS)
Y/R-Y/B-Y
Y/C 443
AC~
"UNITY" (Set to "VARIABLE" to adjust with relevant controls as required.)
Component Switcher
S-VHS Recorder
Inside Front Panel

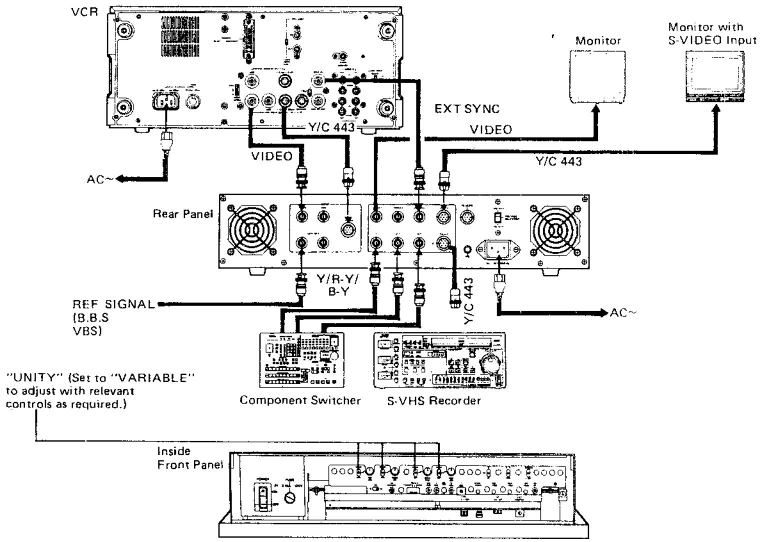
2. Connecting to a VCR not equipped with EXT SYNC input and RF (DOC) output, but equipped with Y/C 443 output.


VCR
Monitor
Monitor with S-VIDEO Input
Y/C 443
VIDEO
VIDEO
Y/C 443
Rear Panel
REF SIGNAL (B.B.S VBS)
Y/R-Y/B-Y
Y/C 443
AC~
"UNITY" (Set to "VARIABLE" to adjust with relevant controls as required.)
Component Switcher
S-VHS Recorder
Inside Front Panel

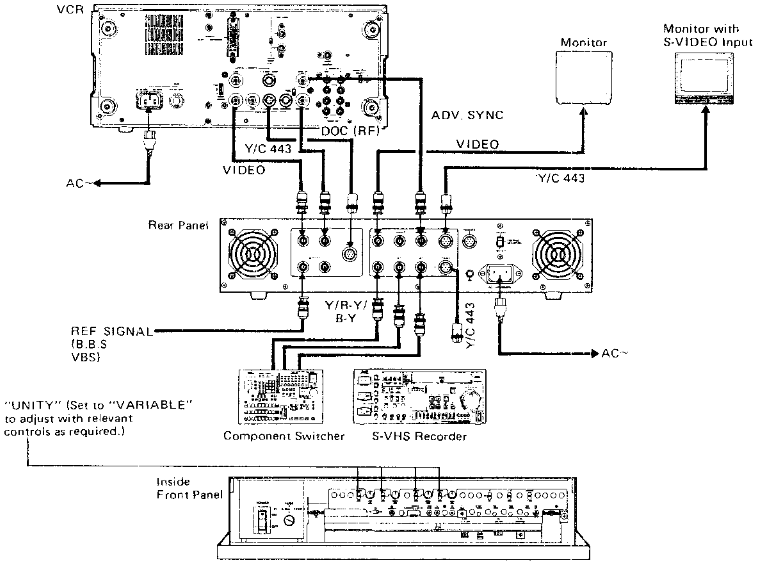
3. Connecting to a VCR equipped with EXT SYNC input, but not with Y/C 443 output and RF (DOC) output.


VCR
EXT SYNC
Monitor
Monitor with S-VIDEO Input
VIDEO
VIDEO
Y/C 443
AC~
Rear Panel
Y/R-Y/ B-Y
Y/C 443
AC~
REF SIGNAL (B.B.S VBS)
"UNITY" (Set to "VARIABLE" to adjust with relevant controls as required.)
Component Switcher
S-VHS Recorder
Inside Front Panel

4. Connecting to a VCR equipped with EXT SYNC input and Y/C 443 input, but not with RF (DOC) output.


VCR
Monitor
Monitor with S-VIDEO Input
EXT SYNC
VIDEO
Y/C 443
VIDEO
Y/C 443
AC~
Rear Panel
Y/R-Y/ B-Y
Y/C 443
AC~
REF SIGNAL (B.B.S VBS)
"UNITY" (Set to "VARIABLE" to adjust with relevant controls as required.)
Component Switcher
S-VHS Recorder
Inside Front Panel

5. Connecting to a VCR equipped with EXT SYNC input, DOC (RF) output and Y/C 443 input and output.


VCR
Monitor
Monitor with S-VIDEO Input
ADV. SYNC
DOC (RF)
VIDEO
Y/C 443
VIDEO
Y/C 443
AC~
Rear Panel
Y/R-Y/ B-Y
Y/C 443
AC~
REF SIGNAL (B.B.S VBS)
"UNITY" (Set to "VARIABLE" to adjust with relevant controls as required.)
Component Switcher
S-VHS Recorder
Inside Front Panel

*1. Since the chroma phase varies depending on the VCR and the length of cable used, adjust the SC control with the CHROMA PHASE switch set to "VARIABLE".

*2. Since the horizontal phase varies depending on the system and the length of cable used, adjust the H PHASE control.

NOISE REDUCER

The Noise Reducer can be switched ON or OFF using NR ON/OFF switch ● inside the front panel.

The Y-NR has three positions;

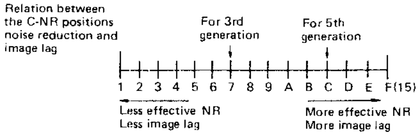
0: OFF
1: High-frequency NR for edge noise reduction
2: High-frequency NR + Low-frequency NR for reduction of edge noise and plane area nose

Mode 2 provides more effective noise reduction than Mode 1; however, Mode 2 reduces resolution somewhat; so Mode 1 is preferable.

The C-NR has 16 positions;

0: OFF
1, 2, 3, 4, 5, 6, 7, 8, 9, A(10), B(11), C(12), D(13), E(14) and F(15).

With positions 1 to F, the limiter width is varied in order to provide the most suitable effect. Usually, use position 7.


Relation between the C-NR positions noise reduction and image lag
For 3rd generation
For 5th generation
1 2 3 4 5 6 7 8 9 A B C D E F(15)
Less effective NR
Less image lag
More effective NR
More image lag

Since noise reduction is done using field difference in principle it results in image lag. For this reason, with a picture with ing plenty of motion, use positions 1 to 5, with which image lag is virtually unnoticeable (but the NR effect will be less). In the case of a picture having less motion or a still picture, use positions with greater noise reduction (but image lag will be greater as well).

SPECIFICATIONS

GENERAL

AC power requirement: AC 102–127 V or 220–240 V,
50/60 Hz
Power consumption : 65 W
Operating temperature: +5 to 40°C
Operating humidity : 10 to 90 %
Dimensions : 430(W) x 88(H) x 515(D) mm
Weight : Approx. 12 kg

VIDEO

Signal process : Component (Y, R-Y, B-Y = 4:2:2)
Time-base correction range : Infinite (1 frame/2 fields)
Sampling frequency : Y: 13.5 MHz
C: 6.75 MHz (4:2:2 format)
Sampling rate : Y: 8-bit
C: 8-bit
Frequency response : Y: 500 kHz to 5 MHz +0.5 dB/–3 dB
C: 4.43 MHz ±0.5 MHz –3 dB
Signal-to-noise ratio : 56 dB p-p/rms without quanting effects
(SC trap on; with Shibasoku noise meter)
DG (APL 50 %) : 2 %
DP (APL 50 %) : 2°
K factor (2T) : 2 %
H tilt : 2 % (Composite mode)
V tilt • : 1 % (Y input & output)
Jitter : Y: ±15 nsec
C: ±2°
Freeze : Frame/field (A/B) selectable
Auto freeze : Bad video sensor (on/off)
Vertical blanking : On/off selectable

INPUT SIGNAL

Video input
Composite : 1.0 Vp-p, 75 ohms
Y/C 443 : Y: 1.0 Vp-p, 75 ohms
C: 0.3 Vp-p, 75 ohms (Burst)
Reference input : 1.0 Vp-p (VBS), 0.45 Vp-p (BB)
75 ohms
RF (DOC) input : 0.2 to 1.0 Vp-p 75 ohms

OUTPUT SIGNAL

Video output
Composite : 1.0 Vp-p, 75 ohms
Y/C 443 : Y: 1.0 Vp-p, 75 ohms
C: 0.3 Vp-p, 75 ohms (Burst)
Component Y: 1.0 Vp-p, 75 ohms
R-Y/B-Y: 0.7 Vp-p, 75 ohms
(100 % colour bar)
Advanced sync output: 4.0 Vp-p, 75 ohms

ACCESSORIES : Rack mount kit

Design and specifications subject to change without notice.

SECTION 1
DISASSEMBLY

1.1 Removing External Covers

1.1.1 Top cover

(1) Remove seven screws (1), then dismount the cover by lifting it.

1.1.2 Front panel

(1) Remove the SW & fuse bracket. Remove five screws (2), then pull the panel forward.

1.1.3 Rear panel

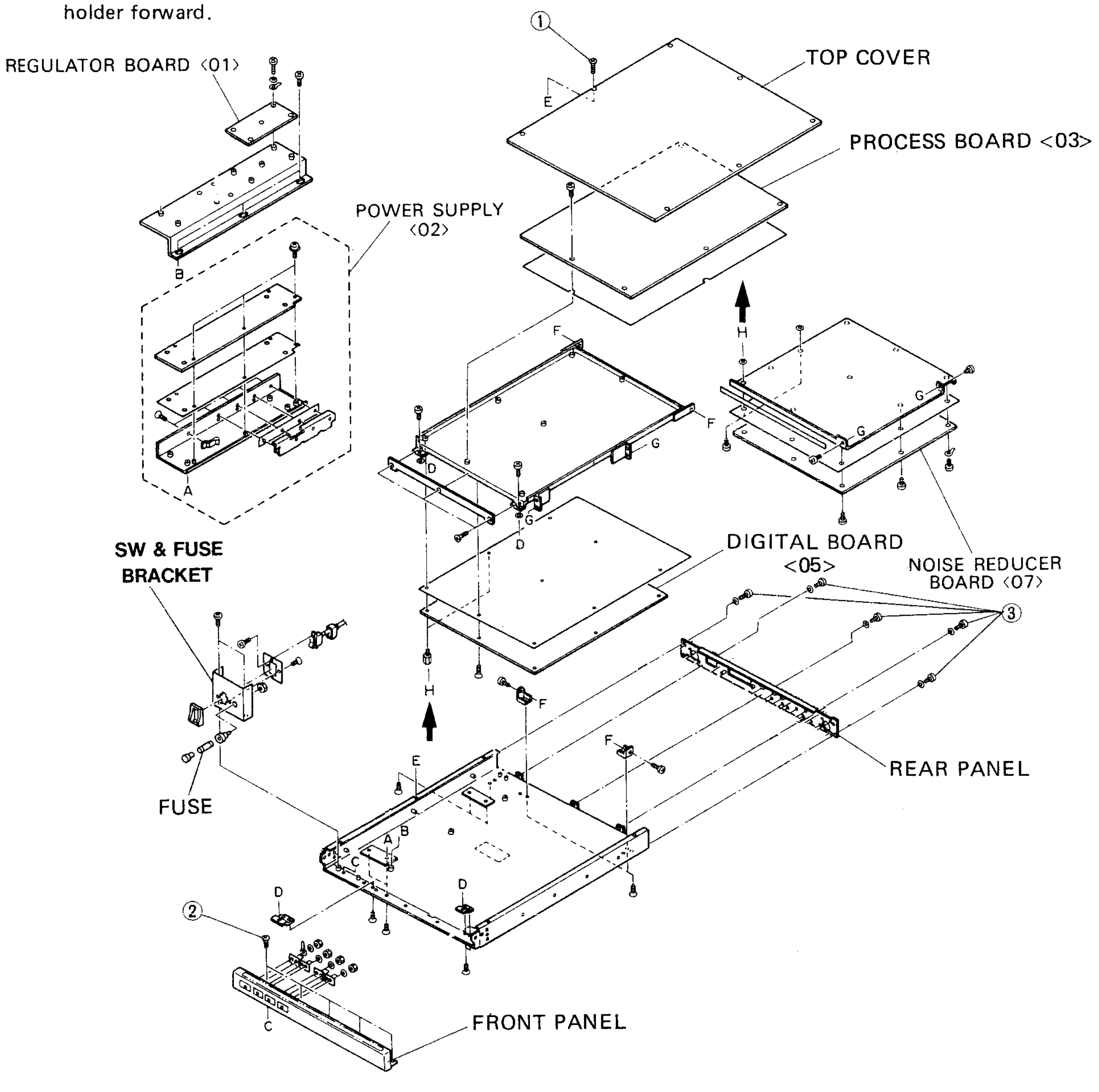
Note : Be sure to turn off the power before removing the connector.

(1) Remove the top cover. Remove seven screws (3), disconnect the connector from the board, then dismount the panel.

1.2 Removing the Fuse

Note: Carefully handle the plastic fuse holder which may be broken easily.

(1) Turn the fuse holder about a 1/8 rotation counterclockwise while pressing it with a slotted screwdriver, then pull the holder forward.


①
REGULATOR BOARD <01>
TOP COVER
PROCESS BOARD <03>
POWER SUPPLY <02>
SW & FUSE BRACKET
DIGITAL BOARD <05>
NOISE REDUCER BOARD <07>
③
REAR PANEL
FUSE
②
FRONT PANEL
A
B
C
D
E
F
G
H

1.3 Removing Main Boards

Note: Be sure to turn off the power before removing or installing a board. Be sure to install the removed boards and connectors at their original positions.

1.3.1 PROCESS board

(1) Remove nine screws (1) to remove the PROCESS board.

1.3.2 DIGITAL board

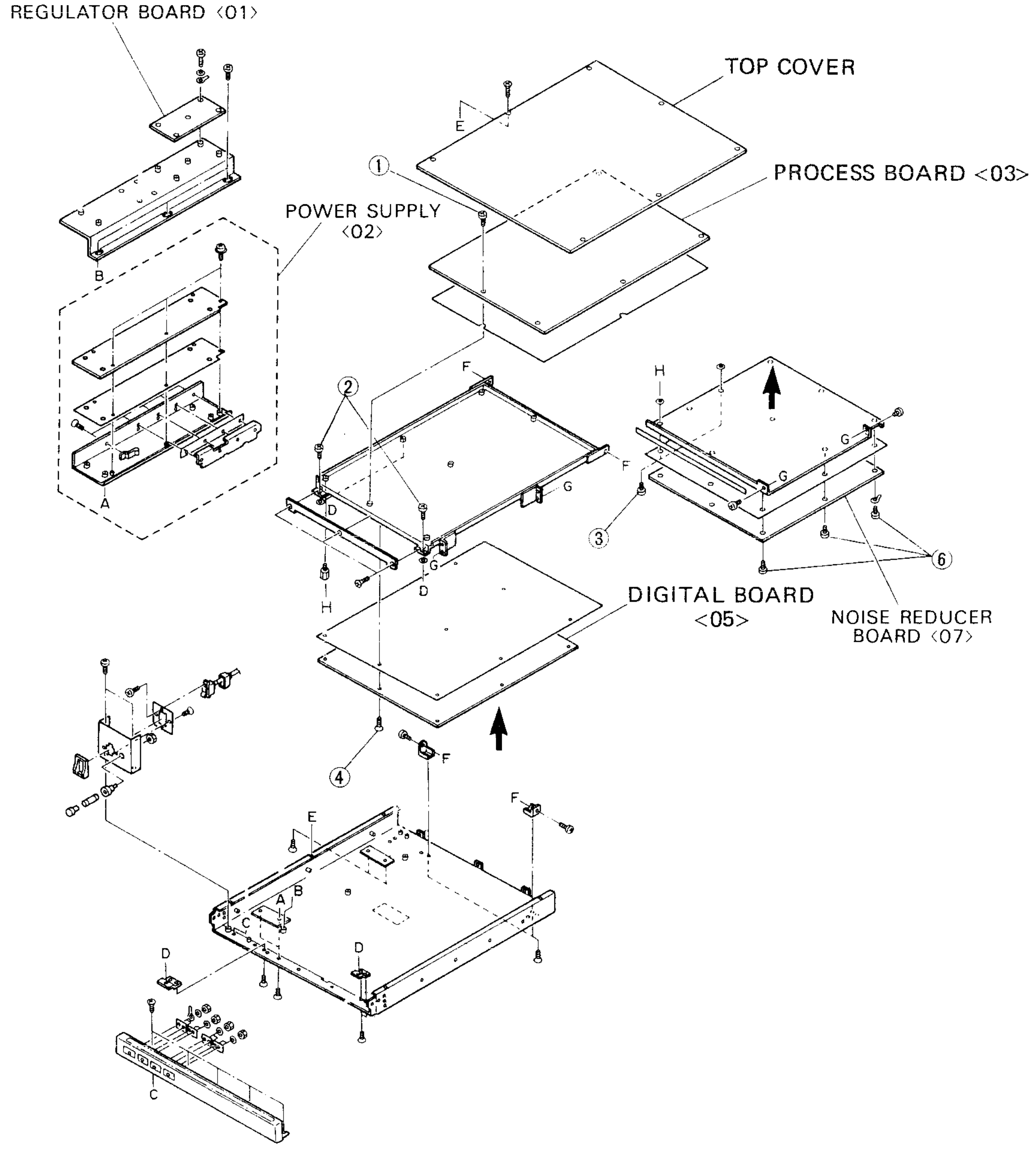
(1) Remove two screws (2), then raise the bracket.

(2) Remove two screws (3), then open the bracket of the NR board. Remove nine screws (4) to remove the DIGITAL board.

1.3.3 NR board

(1) Take step (1) of 1.3.2.

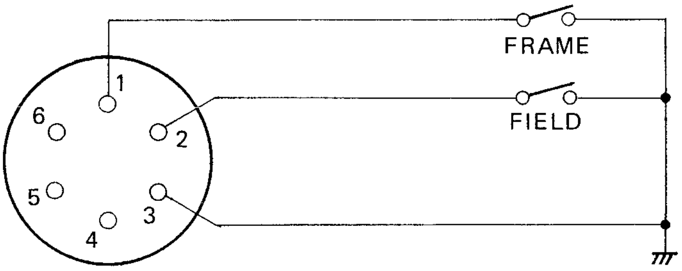
(2) Remove eight screws (6) to remove the NR board.


REGULATOR BOARD <01>
TOP COVER
PROCESS BOARD <03>
POWER SUPPLY <02>
①
②
③
④
⑥
DIGITAL BOARD <05>
NOISE REDUCER BOARD <07>
A
B
C
D
E
F
G
H

1.4 6-pin REMOTE IN Connector

Pin No.	Signals
1	FRAME FREEZE
2	FIELD FREEZE
3	GND
4	RESERVED
5	RESERVED
6	RESERVED

Inputs are momentary make contacts. Closure time should be over 20 msec.
An external remote controller can control SA-T411E by means of FREEZE control signals. If you want to use an external remote controller, you must make it with the circuit shown in the figure below, because an external remote controller is not provided. You will require a 6-pin cable assy (PGZ01345).

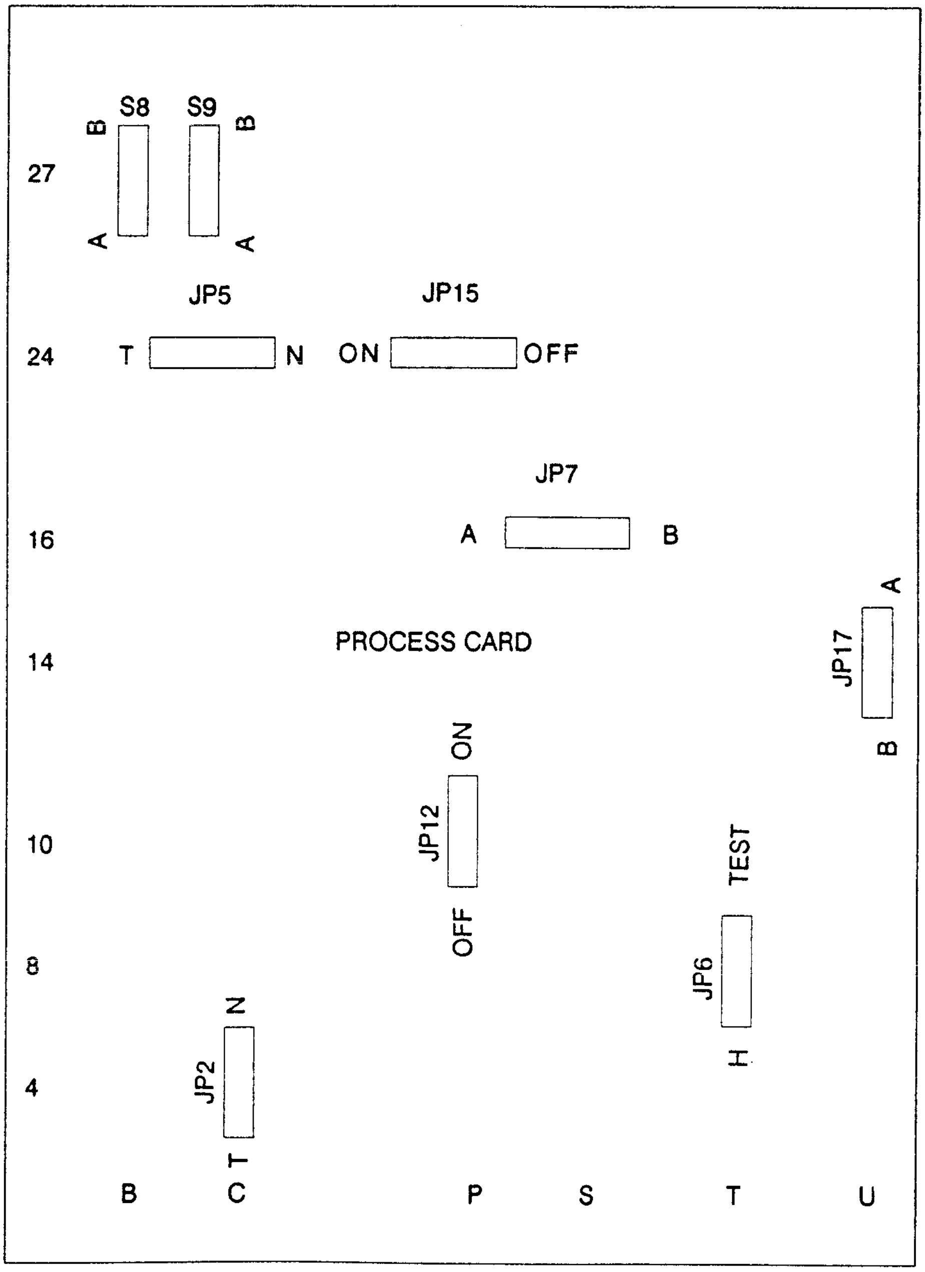


1.5 Internal Switches

1.5.1 NR board

The NR board has SW4 and SW5 for adjustment.

1.5.2 PROCESS board


S8
S9
B
A
B
A
27
JP5
JP15
24
T
N
ON
OFF
JP7
16
A
B
PROCESS CARD
14
JP17
A
B
JP12
ON
OFF
10
JP6
TEST
H
8
JP2
N
T
4
B
C
P
S
T
U

Front Side

JP2

N:Normally set on "N". (Y signal's SC trap is set to OFF.)

JP5

T: Normally set on "T". (Composite output's SC trap is set to ON.)

JP6

H: Normally set on "H".(For the alignment of shuttle mode detection)

JP7

Factory setting. Do not change the setting.

JP12

OFF: Normally set on "OFF".

JP15

ON: When this side is set, the sync signal is added to the PR OUT signal.

OFF: When this side is set, the sync signal is not added to the PR OUT signal.(Factory set is OFF side.)

JP17

A: Normally set on "A".(Factory setting)

B: Set on "B" when using a BETACAM VTR with no time base corrector.

S8,S9

A: When S8 and S9 switches are set on "A", the input Y/C443 signal can be bypassed to the Y/C443-1 output in the Y/C443 input mode.

B: When S8 and S9 switches are set on "B", the input Y/C443 signal can be bypassed to the Y/C443-2 output.

note: Set S8 and S9 to equal position.

1.5.3 DIGITAL board

JP2

VITS: When this side is set, the vertical blanking is released to pass through the VITS signals.

NOR: When this side is set, the normal vertical blanking is applied to the unit.(Factory set is NOR.)

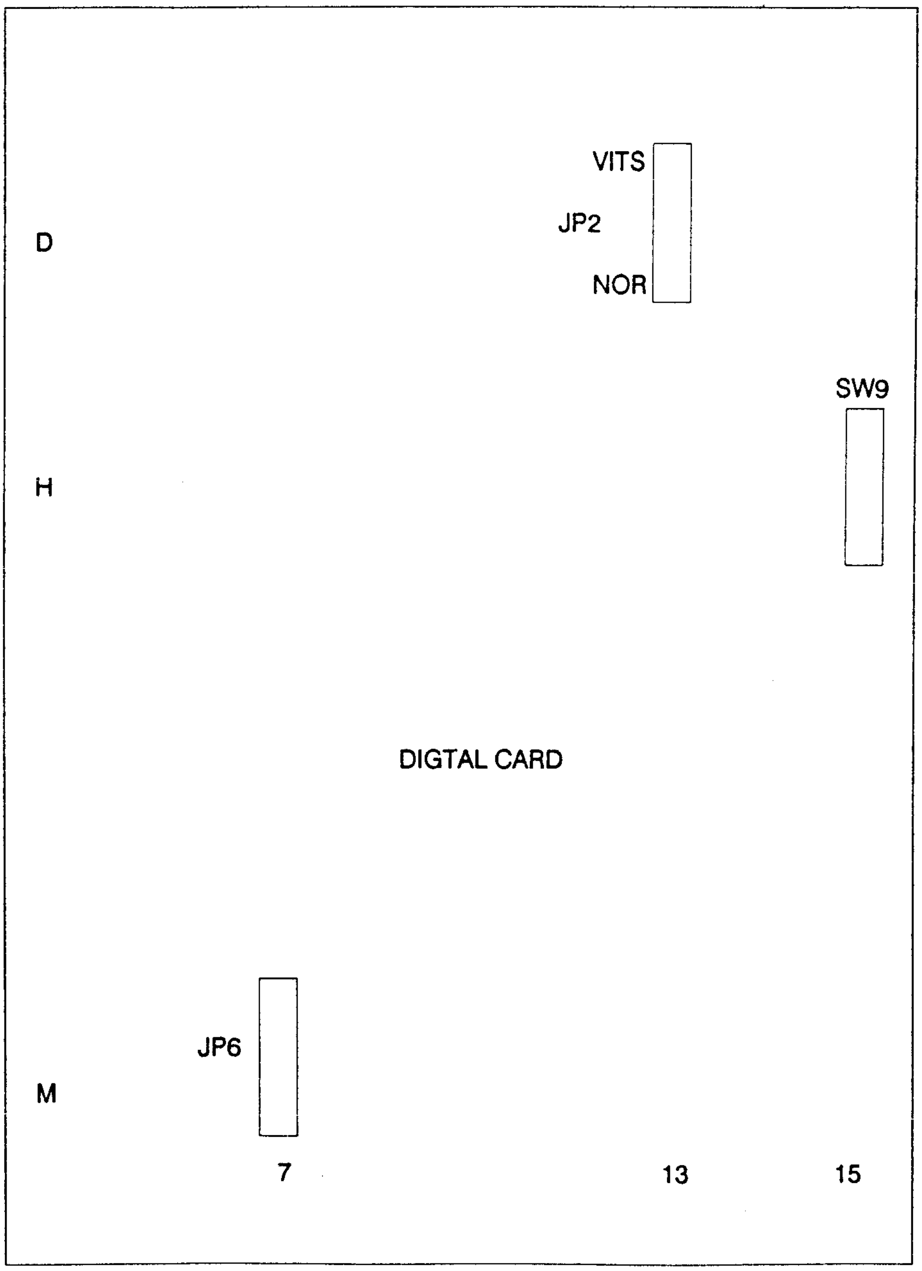
JP6

Normally set open. (Alignment use only.)

SW9

Y delay setting. (Factory setting) Do not change the setting.

Front Side


VITS
JP2
NOR
D
SW9
H
DIGTAL CARD
JP6
M
7
13
15

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 Description of Section

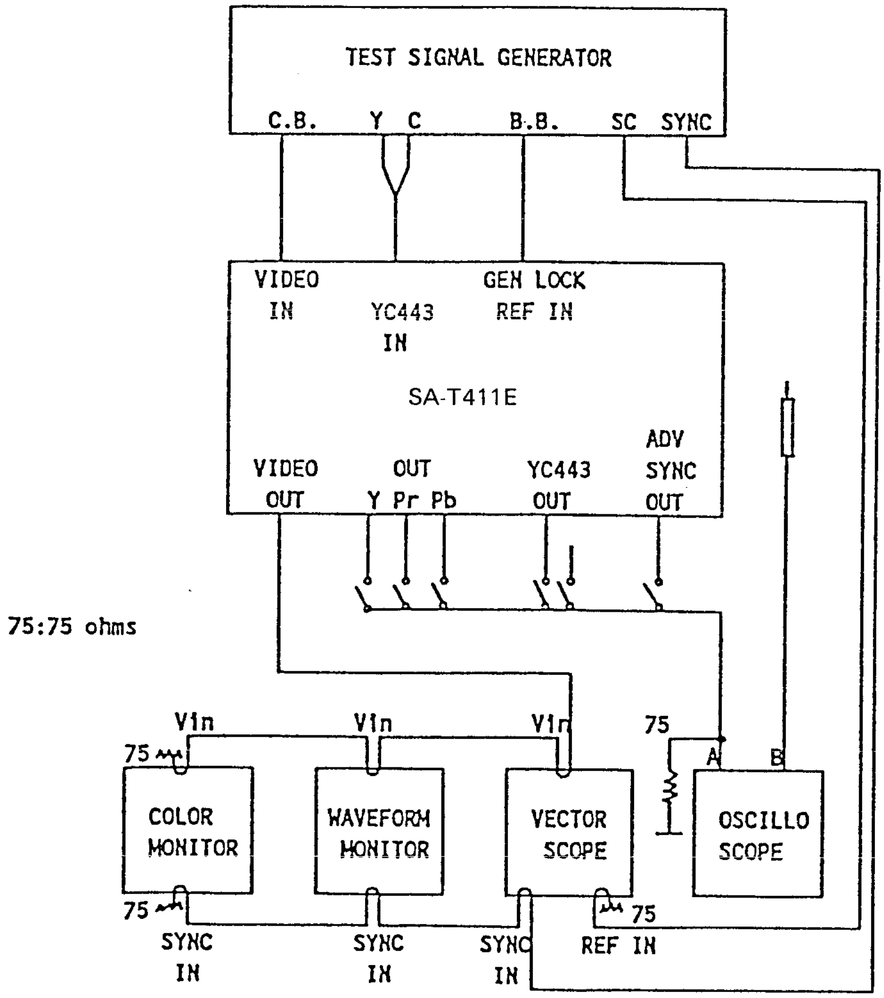
This section describes the adjustment procedures and methods for the SA-T411E. Refer to this section when trouble relating to this unit's operation occurs or when re-adjustment is required.
Section 2.2 describes the connection methods for the adjustments and also the measuring instruments required.
Section 2.3 describes the signals at the test points provided on circuit boards.
Section 2.4 details the actual adjustment methods and procedures for the unit.

2.2 Measuring Instruments

For adjustment, provide the following measuring instruments whose performance is equivalent to, or superior than, that those listed below.

- ○ Color monitor
- ○ Oscilloscope (100 MHz, dual trace)
- ○ Digital voltmeter (accuracy of above 0.01 V)
- ○ Vectorscope (model 1721 by Tektronix, or at least it equivalent)
- ○ Waveform monitor (model 1731 by Tektronix, or at least its equivalent)
- ○ Video signal generator (model 1411 by Tektronix with Y/C output facilities, or at least its equivalent)

Connection Method


TEST SIGNAL GENERATOR
C.B.
Y
C
B.B.
SC
SYNC
VIDEO IN
YC443 IN
GEN LOCK REF IN
SA-T411E
VIDEO OUT
OUT Y Pr Pb
YC443 OUT
ADV SYNC OUT
75:75 ohms
Vin
Vin
Vin
75
75
A
B
COLOR MONITOR
WAVEFORM MONITOR
VECTOR SCOPE
OSCILLO SCOPE
75
75
SYNC IN
SYNC IN
SYNC IN
REF IN

2.3 Check Points

2.3.1 Power Supply Unit

The values for the pins of the power connectors on the regulator board are the values applying when measurement was performed using a digital voltmeter.

Check point		Standard (VDC)	Check point		Standard (VDC)
CN 1	1	15.0±0.2	CN 5	1	2.0±0.1
	2	5.0±0.2		2	GND
	3	GND	CN 6 CN 7	1, 3, 5	GND
CN 2	1, 2	GND		2	5.0±0.2
	3	-5.0±0.2		4	-12.0±0.2
	4	-12.0±0.2		6	12.0±0.2
CN 3	1	12.0±0.2	CN 8	1	5.0±0.2
	2	5.0±0.2		2	GND
	3	5.0±0.2	CN 9	1	9.0±0.2
CN 4	1	5.0±0.2		2	5.0±0.2
	2, 4	GND		3	GND
	3	-5.0±0.2		4	-5.0±0.2
	5	12.0±0.2	CN10	1	12.0±0.2
	6	-12.0±0.2		2, 4	GND
				3	-12.0±0.2

2.3.2 Processor Board

Listed below are the test points provided on this board. (The EBU color bar signal is connected to VIDEO IN and the BB signal to GENLOCK IN; the front panel controls are set to the positions listed in Section 2.4.1, and INPUT SELECT is set to COMPOSITE.)

Test point	Description
TP1 (2-B)	Pedestal of luminance signal separated by comb filter DC 2.2V, 0.5 Vp-p, positive polarity
TP2 (3-C)	Pedestal of luminance signal from analog switch output of appropriate circuit DC 1.3V, 0.5 Vp-p, positive polarity
TP3 (1-M)	GND
TP4 (3-R)	Pedestal of luminance signal ADC input signal DC 0.6V, 1.5 Vp-p, positive polarity

Test point	Description
TP5 (1-V)	GND
TP6 (10-A)	Pedestal of composite signal which has passed through low-pass filter DC -0.8V, 1.8 Vp-p, positive polarity
TP7 (14-A)	GND
TP8 (3-B)	Pedestal of chrominance signal separated by comb filter DC -0.7V, 0.7 Vp-p
TP9 (4-C)	GND
TP10 (4-R)	Color difference R-Y ADC input signal DC 1.6V, 1.2 Vp-p, negative polarity
TP11 (7-F)	GND
TP12 (7-R)	Color difference B-Y ADC input signal DC 1.6V, 1.2 Vp-p, negative polarity
TP13 (8-U)	GND
TP14 (12-J)	GND
TP15 (12-K)	H VCO error voltage DC -3V
TP16 (18-D)	Pedestal of chroma signal for decoding DC 7.8V, 0.6 Vp-p
TP17 (18-D)	GND
TP18 (17-J)	GND
TP19 (12-N)	Separate STNC TTL level Negative polarity
TP20 (13-N)	4 usec pulse TTL level Negative polarity
TP21 (14-R)	GND
TP22 (14-V)	GND

Test point	Description
TP23 (21-C)	Y/C 443 chroma signal DC -0.4V, 1.4 Vp-p
TP24 (19-T)	GND
TP25 (22 L)	Pedestal of luminance signal which has passed through DAC, low-pass filter DC -5.5V, 2.2 VP-P, positive polarity
TP26 (23-J)	Pedestal of encode input color difference R-Y signal DC 3.2V, 0.8 Vp-p, negative polarity
TP27 (24-L)	Pedestal of encode input color difference B-Y signal DC 3.2V, 0.9 Vp-p, negative polarity
TP28 (26-P)	GND
TP29 (27-J)	GND
TP30 (27-R)	GND
TP31 (4-L)	Chroma decoder, burst lock VCO error DC 3.0V
TP32 (8-A)	Pedestal of input chroma signal DC 0.3V, 0.75 Vp-p
TP41 (8-S)	Shuttle FF mode detection pulse, TTL level positive pulse 68 us
TP42 (8-S)	Shuttle REW mode detetion pulse, TTL level positive pulse 60 us
TP43 (10-C)	2H CCD output signal 0.18Vp-p
TP44 (12-C)	2H CCD output signal 0.5Vp-p
TP45 (14-B)	1H CCD output signal 0.25Vp-p
TP46 (19-H)	Encoder input subcarrier 0.1Vp-p
TP47 (14-V)	Input HD pulse, TTL level positive polarity 45 us

2.3.3 Digital Card

Listed below are the test points provided on this board.

Test point	Description
TP1 (1-A)	GND
TP2 (5-A)	Genlock H lock loop error voltage DC 5.0V
TP3 (19-A)	GND
TP4 (1-H)	GND
TP5 (10-F)	GND
TP6 (1-J)	Memory read out data MSB for luminance, TTL level positive polarity
TP7 (1-K)	Memory control pulse (WRITE), TTL level positive polarity
TP8 (1-K)	Memory control pulse (WRITE), TTL level positive polarity
TP9 (1-K)	Memory control pulse (WRITE), TTL level negative polarity
TP10 (1-K)	Memory control pulse (READ), TTL level positive polarity
TP11 (1-K)	Memory control pulse (READ), TTL level positive polarity
TP12 (1-K)	Memory control pulse (WRITE), TTL level positive polarity
TP13 (1-K)	Memory control pulse (READ), TTL level positive polarity
TP14 (1-K)	Memory control pulse (READ), TTL level negative polarity
TP15 (7-J)	Memory control pulse (READ), TTL level negative polarity
TP16 (7-K)	Memory control pulse (WRITE), TTL level negative polarity
TP17 (6-M)	Genlock subcarrier lock loop error voltage, DC 0V, AC approx 5Vp-p

Test point	Description	
TP18 (11-M)	Dropout detection signal	approx. 3.5Vp-p (with 0.7 Vp-p input)
TP19 (18-K)	GND	
TP20 (12-C)	Output subcarrier pulse	TTL level
TP21 (10-D)	Output blanking pulse	TTL level negative polarity
TP22 (13-E)	Input V-drive pulse	TTL level positive polarity
TP23 (18-F)	Input 1/2 H pulse	TTL level
TP24 (19-F)	Output burst signal	approx. 1Vp-p
TP25 (4-L)	Output line alternate reset pulse	TTL level
TP26 (19-N)	Genlock input signal	0.45Vp-p
TP27 (9-C)	Genlock signal burst flag pulse	TTL level negative polarity

2.4 Adjustment Procedure

2.4.1 Control setting

Unless otherwise specified, the switches and controls should be set to the positions listed below. ( ) indicates location on the PWB with the respective address.

Switch or control	Circuit board	Setting
VIDEO LEVEL	Process board	UNITY
CHROMA LEVEL		
CHROMA PHASE		
BLACK LEVEL		
ACC		OFF
B/W /COLOR		COLOR
JP-2 (3A)		N

Switch or control	Circuit board	Setting
JP-12(11P)	Process board	OFF
JP-5 (24B)		T
JP-6 (9T)		H
JP-7 (17S)		Factory setting
JP-15(24P)		OFF
JP-17(14U)		A
BYPASS/OPERATE	Digital board	OPERATE
FRAME FREEZE		OFF
FIELD FREEZE		OFF
STROBE FREEZE		OFF
DOC		ON
Y DELAY		8
AUTO FREEZE		OFF
Y 1H DELAY		OFF
FIELD A/B		OFF
CNR		OFF
JP-2 (12D)		NOR
JP-6 (7M)		OPEN
SW 9 (15H)		Factory setting
Y NR	NR board	1
NR		OFF
C NR		7

2.4.2 Adjustment Modes

Process board, Digital board and NR board must be operated properly if the SA-T411E is to function properly. This section describes the adjustment methods involved.
Most of the adjustments are made on the process board and the following sequence of adjustments should be complied with. Unless otherwise specified, the adjustments should be performed with the switches and controls set to the positions listed in section 2.4.1.

COMP mode

Supply the measurement signal to VIDEO IN (BNC connector). Set the COMP/Y/C443 selector switch to COMP. Unless otherwise specified, the other switches should be set to the positions listed in section 2.4.1.

Y/C443 mode

Supply the measurement signal to Y/C443 (7-pin).
Set the COMP/Y/C443 selector switch to Y/C443. Unless otherwise specified, the other switches should be set to the positions listed in section 2.4.1.

INTERNAL mode

Disconnect the black burst signal from GEN LOCK IN.

B/W mode

Set the B/W/COLOR selector switch to B/W.

ACC mode

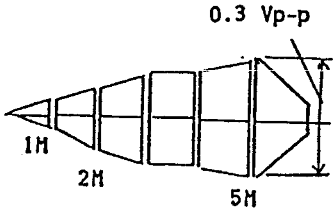
Set the ACC ON/OFF selector switch to ON.

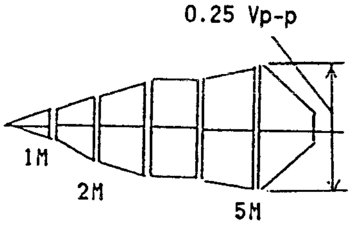
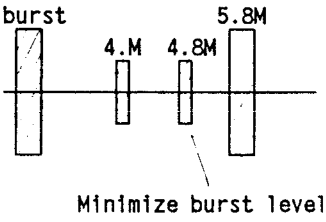
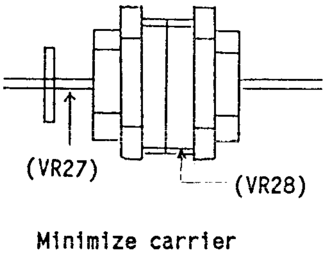
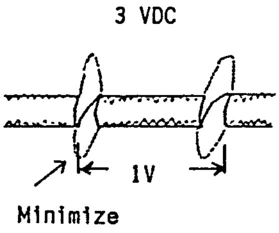
Note : Remember that contact will be made with the switches and controls when the Process Card is raised or lowered with the front panel closed.

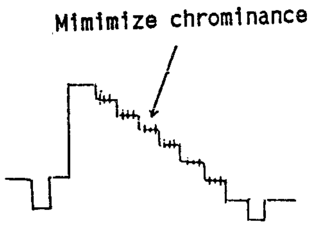
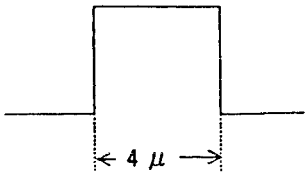
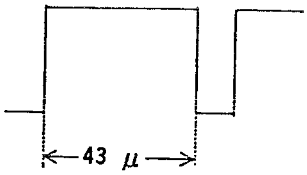
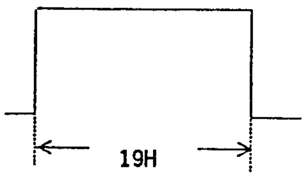
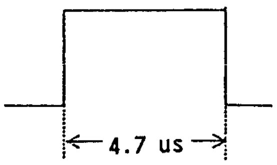
2.4.3. Power Supply

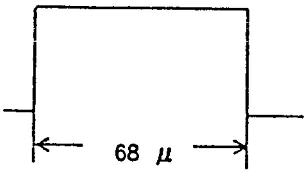
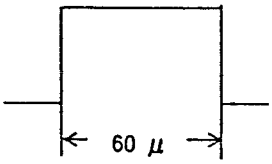
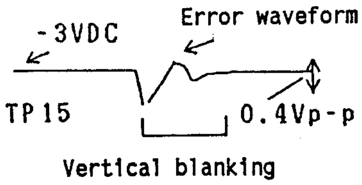
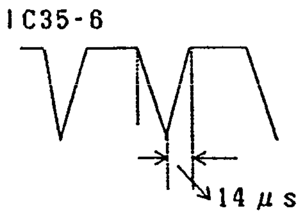
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
1	Supply voltage check					Measure with a digital voltmeter and confirm that the measured value is within the range indicated in section 2.3.1.

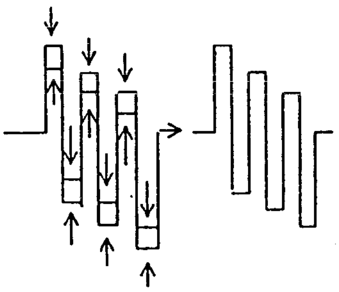
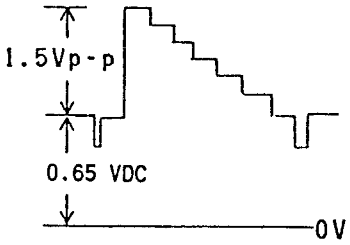
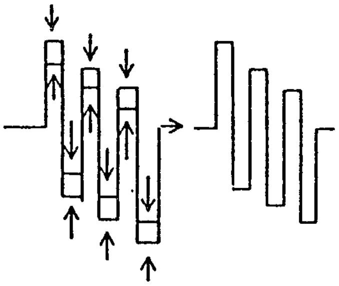
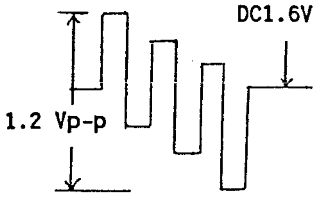
2.4.4. Process Board

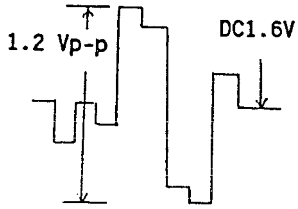
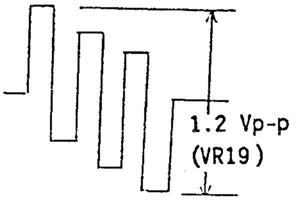
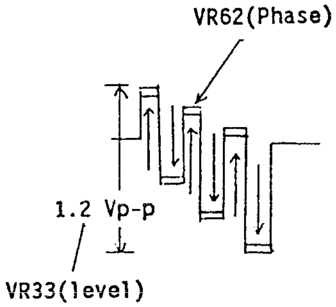
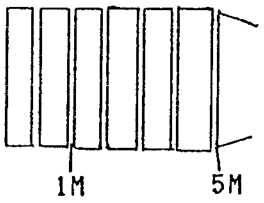
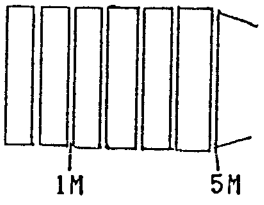
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
1	Input chroma level	TP32 (8A)	VR12 (8A)	EBU color bar	COMP	Adjust VR12 to set the chroma signal level to 0.75 Vp-p.
2	1H CCD frequency response 	TP45 (14B)	L75 (15B) L76 (15B)	SWEEP	COMP	Observe the TP45 waveforms on the oscilloscope, and adjust the L75 and L76 core to produce the waveforms shown in the figure on the left.

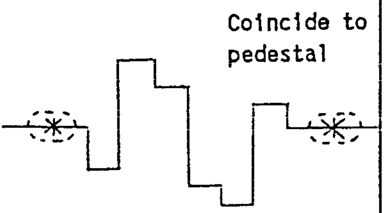
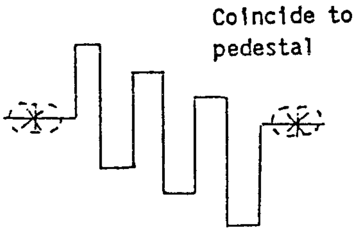
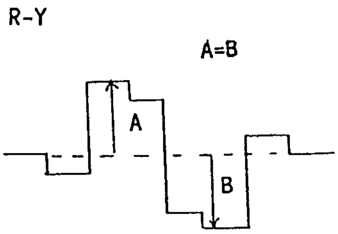
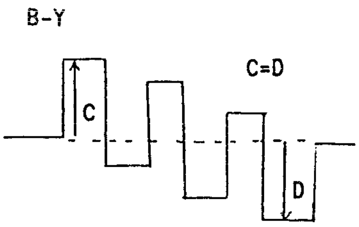
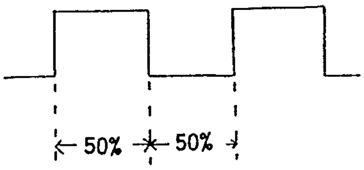
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
3	2H CCD frequency response		VR18 (12B)			Turn VR18 (12B) clockwise as far as it will go.
		TP43 (10D)	L27 (9D) L29 (9D)	SWEEP	COMP	Observe the TP43 waveforms on the oscilloscope, and adjust the L27 and L29 core to produce the waveforms shown in the figure on the left.
4	Comb filter balance 	TP8 (3B)	VR16(8C) VR17(11B)	MULTI BURST	COMP	Observe the waveforms at TP8 on the oscilloscope, and adjust VR16 and VR17 so that the burst signal at 4MHz and 4.8MHz are minimized, as shown in the figure on the left.
5	2SC modulator balance 	Q37-C (10E)	VR27(8H) VR28(12J)	EBU color bar	COMP	Observe the Q37-C waveforms on the oscilloscope and adjust VR28 to make the waveform as shown in the figure on the left. Then adjust VR27 so that the pedestal carrier is set to its minimum.
6	Burst lock VCO 	TP31 (3L)	VR9 (2M)	EBU color bar	COMP	Observe the TP31 DC voltage using the oscilloscope, adjust VR9 to set it to 3VDC. Set the oscilloscope to the AC mode (set the oscilloscope gain to its maximum), observe the voltage at the V rate, and adjust VR9 finely, as in the figure on the left.

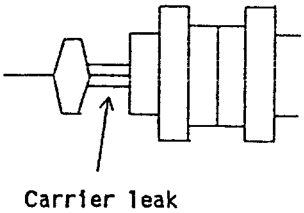
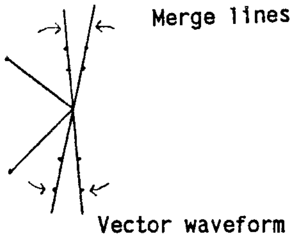
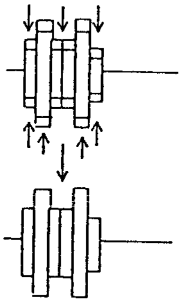
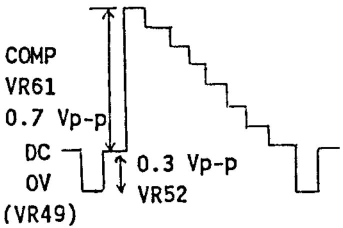
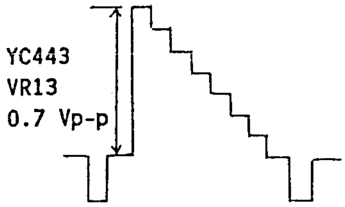
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
7	Comb filter 	TP1 (2B)	VR14 (6B) VR15 (7B)	EBU color bar	COMP	Observe the TP1 and adjust VR14 and VR15 so that the chroma components in the (Y/C separated) luminance signal are minimized.
8	Input sync	TP19 (12N)		EBU color bar	COMP	Check that a negative polarity TTL level sync signal is output at TP19.
9		TP20 (13N)	VR36 (12P)	EBU color bar	COMP	Adjust VR36 to produce a TTL level positive polarity pulse at TP20 with a width of 4 usec.
10		TP47 (14U)	VR41 (14S)	EBU color bar	COMP	Use the oscilloscope and adjust VR41 to produce a TTL level positive polarity pulse at TP47 with a width of 43 usec.
11		IC49-4	VR40 (12R)	EBU color bar	COMP	Adjust VR40 to produce a TTL level negative polarity pulse at IC49-4 with a width of 19H (1.216 msec).
12		JP17-B	VR67 (14T)	EBU color bar	COMP	Adjust VR67 to produce a TTL level negative polarity pulse at JP17-B with a width of 4.7 usec.

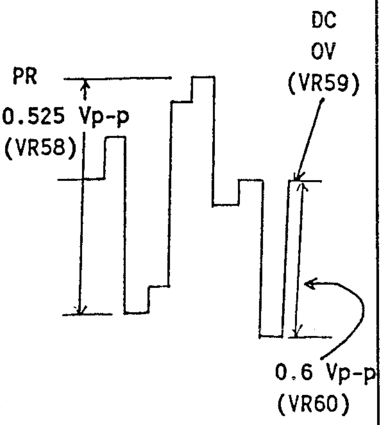
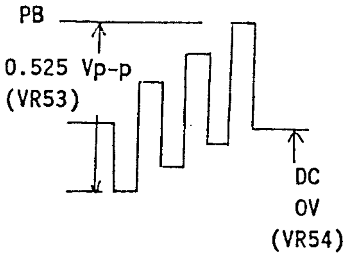
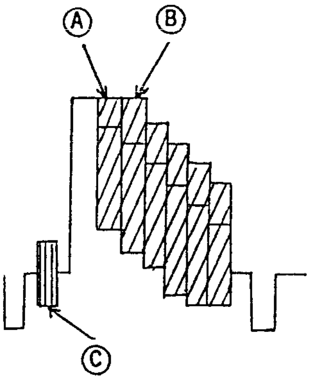
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
13	FF mode detection pulse 	TP41 (8S)	VP39 (10S) JP6 TEST (9T)	EBU color bar	COMP	Set JP6 from H to TEST and adjust VR39 using the oscilloscope to produce a TTL level positive polarity pulse at TP41 with a width of 68 usec.
			JP6 H (9T)			After above adjustment, set JP6 to H side.
14	REW mode detection pulse 	TP42 (8S)	VR38 (10R)	EBU color bar	COMP	Adjust VR38 using the oscilloscope to produce a TTL level positive polarity pulse at TP42 with a width of 60 usec.
15	SHUTTLE mode detection check	IC40-8 (9P)		EBU color bar	COMP	Check on the oscilloscope that the signal at IC40-8 is the TTL high level. (If it is low, it may mean that the detection pulse is not functioning normally or that the comparator is not operating.)
16	H VCO adjustment  -3VDC Error waveform TP15 0.4Vp-p Vertical blanking	TP15 (12K)	L34 (12K) VR32 (12M)	EBU color bar	COMP	Adjust L34 to produce a voltage of -3 VDC at TP15. Adjust VR32 to set the error waveform to 0.4 Vp-p. (This VR is set so that the jitter in the VTR input signals is minimized.)
		IC35-6 (16L)	VR31 (15K)			Adjust VR31 so that the trapezoidal rising waveform at IC35-6 has a width of 14 usec on the oscilloscope.

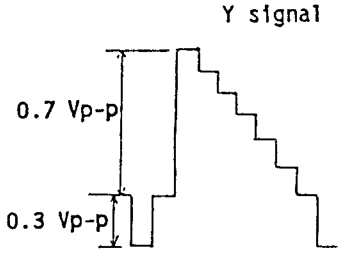
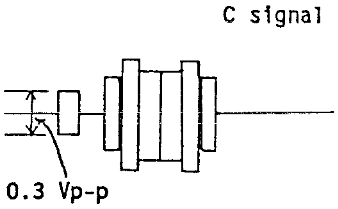
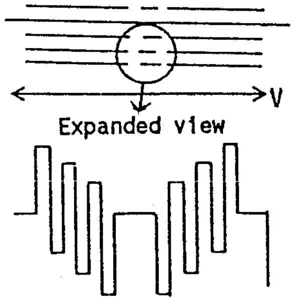
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
17	Chroma decoder phase 	TP12 (7R)	VR30 (13F)	EBU color bar	COMP	Adjust VR30 to produce a negative polarity correct waveform at TP12.
18	Y A/D converter 	TP4 (3R)	VR2 (2A)	EBU color bar	COMP	Adjust VR2 to set the luminance signal to 1.5 Vp-p at TP4. Re-adjust the comb filter (adjustment No.7) since the chroma components of the luminance signal will increase.
			VR11 (3S)			Next, adjust VR11 to set the pedestal potential of the luminance signal at TP4 to 0.65 VDC.
19		TP12 (7R)	VR63 (17B)	EBU color bar	Y/C443	Adjust VR63 to produce a negative polarity B-Y signal with the correct waveform at TP12.
20	Color difference A/D converter 	TP12 (7R)	VR25 (6M) VR26 (7S)	EBU color bar	Y/C443	Adjust VR25 so that the waveform at TP12 is set to 1.2 Vp-p. Next, adjust VR26 so that the DC voltage of the pedestal is set to 1.6V.

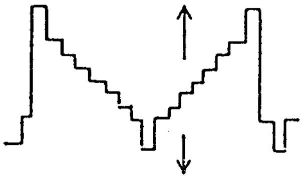
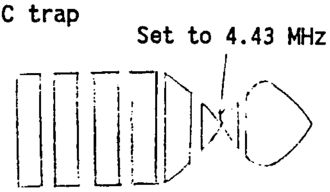
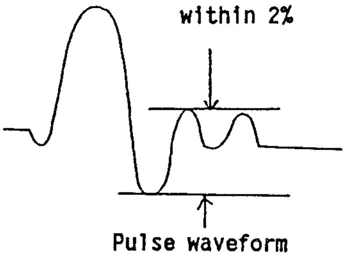
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
21		TP10 (4R)	VR23 (4M) VR24 (5S)	EBU color bar	Y/C443	Adjust VR23 to produce a 1.2 Vp-p waveform at TP10. Next, adjust VR24 so that the DC voltage of the pedestal is set to 1.6V.
22		TP12 (7R)	VR19 (15B)	EBU color bar	COMP	Adjust VR19 so that the waveform at TP12 is set to 1.2 Vp-p.
			VR62 (16E)			If the phase shifts, adjust VR62.
					Y/C443	Switch alternately between adjustments No.20 and No.22, and adjust so that the waveforms and phases are identical.
23	Chroma ACC 	TP12 (7R)	VR33 (19E) VR62 (16E)	EBU color bar	COMP ACC	Set the ACC switch on the front panel of the process card to ON. Adjust VR33 to set the level at TP12 to 1.2 Vp-p. Adjust VR62 to produce the same waveforms as when the ACC switch is OFF.
24		TP4 (3R)	L8 (2P)	Sweep	Y/C443	Rotate L8 and adjust the frequency response to 5 MHz +/-0.1 dB.
				Pulse & bar		Check that the K factor is 1% or less.
25		TP6 (10A)	L70 (12A)	Sweep	COMP	Rotate L70 and adjust the frequency response to 5 MHz -0.2 dB.
				Pulse & bar		Check that the K factor is 1% or less.

No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
26	D/A converter 	TP26 (23J)	VR55 (24T)	EBU color bar	COMP	Adjust VR55 so that the pedestal level and the level applying during the horizontal blanking period of the R-Y signal at TP26 are made to coincide.
27		TP27 (23L)	VR56 (24V)	EBU color bar	COMP	Adjust VR56 so that the pedestal level and the level applying during the horizontal blanking period of the B-Y signal at TP27 are made to coincide.
28		TP26 (23J)	VC4 (25T)	EBU color bar	COMP	Adjust VC4 so that the levels A and B are identical at TP26.
		TP27 (23L)	VC5 (22T)			Adjust VC5 so that the levels C and D are identical at TP27.
29	SC duty 	TP7 B (17S)	VR42 (19S)	EBU color bar	COMP	Adjust VR42 so that the duty is 50% at JP7-B.
30	Encoder input level	TP46 (19H)	VR34 (17H)	EBU color bar	COMP	Adjust VR34 to set the SC level at TP46 to 0.1 Vp-p.

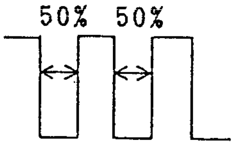
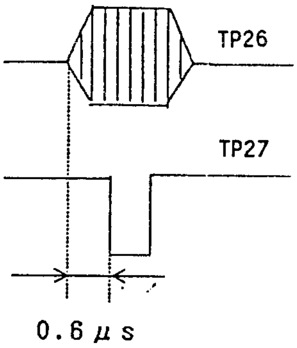
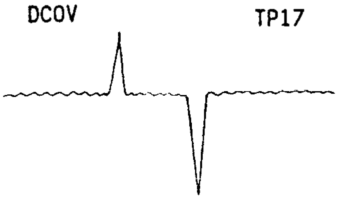
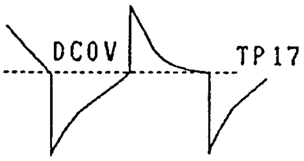
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
31	Encoder carrier leak  	TP23 (21C)	VR44 (21H) VR46 (20K)	EBU color bar	COMP	Adjust VR44 and VR46 so that the carrier leak components in the encode chroma signal are reduced to the minimum. (Adjust so that the lines in the position shown in the figure are made as thin as possible.)
32	R-Y merge lines  	Rear panel VIDEO 1 OUT (BNC connector)	VC6 (18H)	EBU color bar (B-Y OFF)	COMP	Terminate VIDEO 1 OUT with 75 ohms and connect to the vectorscope. Adjust VC6 so that the crossing two lines are merged to one line.
33	Encode chroma quadrature 	TP23 (21D)	L39 (18K)	EBU color bar	COMP	When the waveforms at TP23 are duplicated as shown in the figure on the left, adjust L39 so that a single waveform is produced.
34	Component Y signal  COMP VR61 0.7 Vp-p DC 0V (VR49) 0.3 Vp-p VR52	Rear panel Y OUT (BNC)	VR52 (23F) VR61 (21L) VR49 (21R)	EBU color bar	COMP	Terminate the Y OUT connecotor with a 75-ohm and connect to the oscilloscope. Set the signal level to 0.7 Vp-p with VR61 and the sync level to 0.3Vp-p. Adjust VR52 to set the pedestal to 0 Vdc.
	 		VR13 (4B)		Y/C443	Set the signal level to 0.7 Vp-p with VR13.

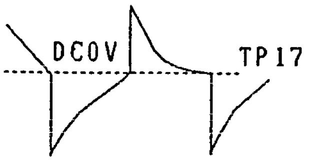
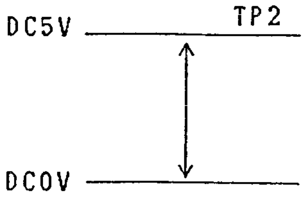
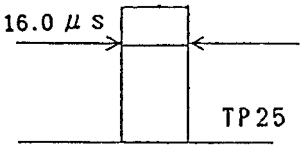
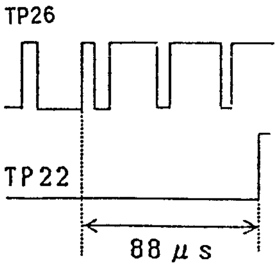
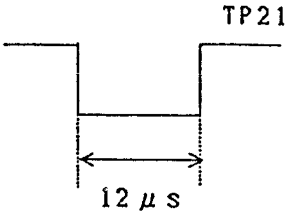
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
35	Component color difference signal  DC OV (VR59) PR 0.525 Vp-p (VR58) 0.6 Vp-p (VR60)	Rear panel PR OUT (BNC)	VR58 (25M) VR59 (26N) VR60 (26N) JP15-ON (23N)	EBU color bar	COMP	Terminate the PR OUT connector with a 75-ohms and connect to the oscilloscope. Set JP15 to ON. Adjust the sync level to 0.6Vp-p. Adjust VR58 to set the signal level to 0.525 Vp-p and VR59 to set the pedestal to 0VDC. (Adjust VR58 and VR59 alternately.)
			JP15-OFF VR59(26N)			Set JP15 to OFF after adjustment. Readjust VR59 to set the pedestal to 0 VDC.
36		Rear panel PB OUT (BNC)	VR53 (23N) VR54 (23P)			Adjust VR53 to set the signal level to 0.525 Vp-p and VR54 to set the pedestal to 0 VDC. (Adjust VR53 and VR54 alternately.)
37	Composite video OUT  ⒶSet YL level as CY level with VR35. ⒷSet chroma level as white level of Y signal with VR50. ⒸSet burst level to 0.3 Vp-p with VR43.	Rear panel VIDEO 1 OUT (BNC) (Vector-scope)		EBU color bar	COMP	Terminate the VIDEO 1 OUT with 75 ohms and connect to the oscilloscope.
			VR50 (23C)			Adjust VR50 to set chroma level to the same level as white level of Y signal.
			VR51 (23D)			Adjust VR51 to set the level from sync tip to white to 1.0 Vp-p.
			VR43 (19F)			Adjust VR43 to set the burst level to 0.3 Vp-p.
			VR48 (25E)			Adjust VR48 so that the pedestal DC level of video signal is measured as same level at AC and DC ranges on the oscilloscope.

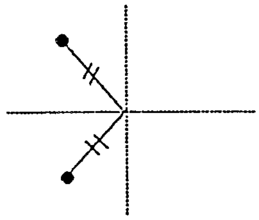
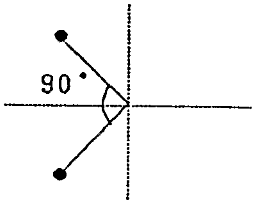
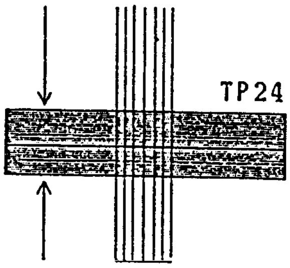
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
37		Rear panel VIDEO 1 OUT (BNC) (Vector-scope)	VR35 (19J) L39 (18K)	EBU color bar	COMP	Connect VIDEO 1 OUT to the vectorscope and adjust L39 and VR35 to obtain the optimum U and V vectors.
					Y/C443	Check the same procedures as above with Y/C443 mode.
38	Y/C443 	Rear panel Y/C443 OUT		EBU color bar	Y/C443	Terminate the rear panel Y/C443-1 or 2 OUT connector with a 75-ohm resistance and connect to the oscilloscope. Check that the luminance signal level is that bypass mode. (In the bypass mode, the bypass signals appear at the Y/C443-2 OUT connector when S8 and S9 (27-A) are set to A side, and they appear at the Y/C443-1 OUT connector when they are set to B side.)
			VR57 (24B)			Adjust VR57 so that the chroma level signal is set to the same as that applying in the bypass mode.
			VR21 (20B)			Adjust VR21 so that the burst phase of Y/C443 OUT C-signal is the same as the VIDEO 1 OUT.
39	Flexible circuits Color difference channel 	TP12(6R)	JP12 ON (11P) VR29 (15D) VR20 (15B)	Reversed color bar	COMP	Set JP12 to ON side. As shown in the figure on left, use the oscillator delay to expand the area where the comb filter does not function in the center, use VR29 to adjust the 2H phase and use VR20 to adjust the level as the signal before and after.

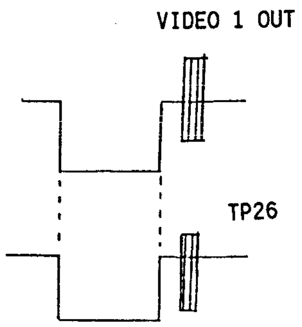
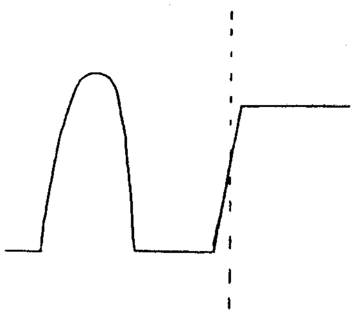
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
40	Flexible circuits Luminance channel 	TP4 (4R)	VR1 (1A) JP12 OFF	Reversed color bar	COMP	As shown in the figure on left, use the oscillator delay to expand the area where the comb filter does not function in the center, and use VR1 to adjust the level of the 2H luminance signal where the comb filter does not function as the signal before and after. Set JP12 to OFF side.
41	SC trap 	Rear panel VIDEO 1 OUT (BNC)	VC2 (23B)	SWEEP	COMP COLOR	Set to COLOR mode. Terminate the VIDEO 1 OUT connector with a 75 ohm resistance and connect to the oscilloscope. Adjust VC2 to set the trap frequency to 4.43 MHz.
42		Rear panel Y OUT (BNC)	JP2-T (5C) VC1 (3C) JP2-N	SWEEP	COMP B/W	Set JP2 to T side. Terminate the Y OUT connector with a 75-ohm resistance and connect to the oscilloscope. Adjust VC1 to set the trap frequency to 4.43 MHz. Set JP2 to N side.
43	K-factor 	Rear panel VIDEO 1 OUT (BNC)	VR66 (23E)	Pulse & bar	COMP	Terminate the VIDEO 1 OUT with 75 ohms and connect to the oscilloscope. Adjust VR66 to set the K-factor to within 2%.

2.4.5. Digital Board

No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
1	TP20  	TP20 (12B)	VR5 (12A)	EBU color bar	COMP	Use VR5 to adjust the duty ratio to 50%. ratio to 50%.
2	 	TP26 (18N) TP27 (10C)	VR7 (10D)	EBU color bar	COMP	Observe TP26 and TP27 using dual-trace oscilloscope. Adjust VR7 so that the pulse timeing is set as the figure at left.
3	 	TP17 (6M)	JP6 (7M) Short VR11 (6M)	EBU color bar	COMP	Insert a jumper plug into JP6 to shortcircuit it, and adjust VR11 so that the DC voltage at TP17 is set to 0.0 VDC.
4	Subcarrier Lock  	TP17 (6M)	JP6 (7M)-open VC2 (2A)	EBU color bar	COMP	Disconnect the JP6 jumper plug, and adjust VC2 so that the average level is made 0.0 VDC at TP17.
5	Internal Frequency	Rear panel VIDEO 1 OUT	VC1 (1B)	EBU color bar	COMP INTER-NAL	Set the SA-T411E with the GENLOCK input disconnected to the internal mode, and adjust VC1 so that the burst rotation on the vectorscope is brought to a standstill as far as possible.

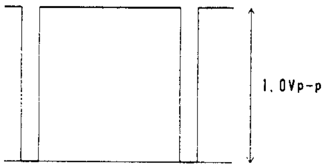
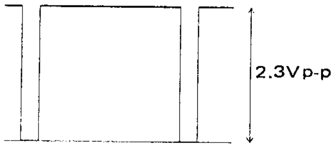
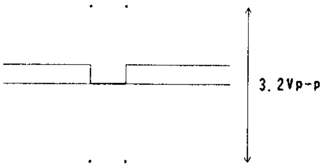
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
6		TP17 (6M)	VC2 (2A)	EBU color bar	COMP	Connect the GENLOCK input and adjust VC2 again so that the average level at TP17 is made 0.0 VDC.
7	Horizontal Lock 	TP2 (4A)	VC3 (4B)	EBU color bar	COMP	Adjust VC3 so that the DC voltage at TP2 is set to 5 VDC.
8		TP25 (4L)	VR10 (5N)	EBU color bar	COMP	Adjust VR10 so that the width of the TTL level positive polarity pulse at TP25 is set to 16.0 usec.
9	INPUT VD 	TP26 (18N) TP22 (14E)	VR9 (15D)	EBU color bar	COMP	Adjust VR9 to bring the rising edge of pulse at TP22 to a position which is 88 usec from the rise edge at TP26 as figure at left.
10	Blanking 	TP21 (11D)	VR8 (10D)	EBU color bar	COMP	Adjust VR8 so that the width of the TTL level negative polarity pulse at TP21 is set to 12 usec.

No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
11	Burst 1 	Rear panel VIDEO 1 OUT	L6 (15L)	EBU color bar	COMP	Adjust L6 so that the length of the two bursts is made equal on the vectorscope.
12	Burst 2 	Rear panel VIDEO 1 OUT	VR12 (17L)	EBU color bar	COMP	Adjust VR12 so that the angle formed between the two burst signals on the vectorscope is set to 90 degrees.
13	Burst 3  Minimum	TP24 (19F)	VR14 (19L)	EBU color bar	COMP	Adjust VR14 so that the carrier leak at TP24 is reduced to its minimum (so that the lines become as thin as possible).

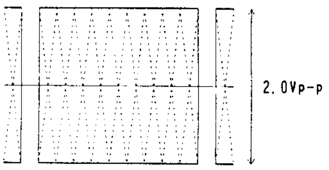
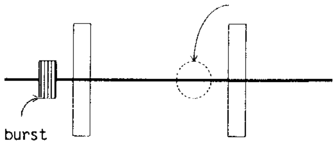
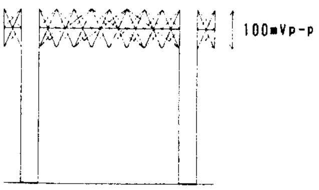
No.	Adjustment	Check point	Adjustment location	Signal	Mode	Description
14	Gen-lock phase 	Rear panel VIDEO 1 OUT	H PHASE (Card edge)	EBU color bar	COMP	Observe the VIDEO 1 OUT and TP26 using dual trace oscilloscope. Adjust H.PHASE so that the H sync phase is identical.
15	Video phase 	Rear panel	VIDEO PHASE (Card edge)	Pulse & bar	COMP	Set the oscilloscope to the external drive mode and connect VIDEO 1 OUT to the oscilloscope with 75 ohm termination. Adjust VIDEO PHASE so that the rising edge of 2T bar signal is identical at bypass and operate mode.

2.4.6. Noise Reducer Circuit

Note) In the following adjustment procedure, test points and adjusting VRs are on the NR board, unless otherwise specified.

No.	Item	TP	Adjust- ment point	Mode	Adjustment and check
1	Input level adjustment	TP301 TP306 TP311	R201 R217 R233	100%White Y/C443	1. Connect an oscilloscope to each test point. Adjust each adjusting VR so that the input level is within 1.0 ± 0.03 Vp-p. 
2	Output level adjustment	TP303	R318	100%White Y/C443	1. Connect an oscilloscope to TP303. Adjust R318 so that the output level is within 2.3 ± 0.06 Vp-p. 
3	NR position 2 limiter adjustment	TP308	R353	100%White Y/C443 SW4:OFF NR SW:ON Y NR SW:2	1. Connect an oscilloscope to TP308. Adjust R353 so that the voltage level is within 3.2 ± 0.1 Vp-p. 2. Turn on SW4 and turn off the NR SW after the adjustment. 

Note) In the following adjustment procedure, test points and adjusting VRs are on the NR board, unless otherwise specified.

No.	Item	TP	Adjustment point	Mode	Adjustment and check
4	**ALU input level adjustment** **Note)** When the Mod. Bar signal is input, the composite video of the signal generator is input to the Y side of Y/C443 input.	TP302 TP307 TP312	R309 R332 R366	Mod. Bar Y/C443	1. Connect an oscilloscope to each test point. Adjust each VR so that the input level is within 2.0 ± 0.06 Vp-p. 
5	**ALU phase adjustment** **Note)** When the Pulse & Bar signal is input, the composite video of the signal generator is input to the Y side of Y/C443.	TP302 TP307 TP312	R305 R309 R362 R366	Pulse & Bar Y/C443	1. Connect an oscilloscope to TP307 and TP302, and set the oscilloscope to ADD mode. 2. Adjust R305 and R309 so that the burst level is minimum on the one line. 3. In the same manner as above adjust R362 and R366 at TP307 and TP312. 
6	**NR position 1 limiter adjustment**	TP303	R373 R383	Mod. Bar Y/C443 SW5:OFF NR SW:ON Y NR SW:1	1. Connect an oscilloscope to TP303. Adjust R373 and R383 to minimize the residual chroma component. 2. Turn on SW5 and turn off the NR SW after the adjustment. 

SECTION 3
CIRCUIT DESCRIPTION

3.1 PROCESSOR Card

This card processes the input video signal, A/D converts it, D/A converts the digital signal read from the memory, and performs the necessary processing for providing a video output.

It consists mainly of analog circuits. The sync signal generator circuit system on the output side is contained in the digital board.

3.1.1. Input process

The composite video input (VIDEO IN) or the Y signal (S-Y) of the S VHS video input is selected by IC9 according to the particular select mode which is activated. The selected signal passes through a buffer amplifier (Q15, 16) then through a level controller (IC7, 8).

If the Y signal (S-Y) is selected, it passes through the S VHS/composite (S/C) mode select switch IC1, then through a buffer amplifier (Q5 to 7) and a low-pass filter. It is then DC-clamped by a feedback clamp circuit (IC4, IC6, Q8, Q9), and the resulting signal is input to the Y signal A/D converter (IC5).

If the composite video input (VIDEO IN) is selected, it first passes through a level controller, as mentioned above, then through a low-pass filter and a buffer amplifier (Q12, Q13) into the Y/C separator circuit which uses a comb filter, causing the Y signal to be separated out. The Y signal then passes through the abovementioned S/C mode selector and is A/D converted into an 8-bit digital signal.

The 1H delay used in the comb filter is generated by CCDs (IC24, IC28), which have a delay of 1H and 2H, respectively. A chroma signal (0H) which passes through a band-pass filter and buffer amplifier (Q10, Q11) is input to the CCDs.

The 1H delay signal is then modulated by 2SC, aligning the relationship between the U and V vectors which are used to form the comb filter.

The 0H, 1H and 2H delay signals are added and phase-adjusted by an adder circuit (Q19, Q20). The resulting signal is output by Q18 as the chroma output of the comb filter.

This C signal is added to the composite signal which has been adjusted to the same phase as the C signal by a delay coil (DL1), then the chroma signal is extracted from the composite signal, resulting in the Y signal.

In the case of the PAL format, however, it is not possible to perform complete Y/C separation because of the principle employed, and also the output video signal of the VTR contains a time-base error with respect to the comb filter which uses a 1H delay circuit, hence the 1H time interval is not accurate.

Consequently, Y/C separation does not always take place completely. To minimize the effect of this, therefore, a trap circuit is inserted near the SC frequency of the Y signal.

The comb filter utilizes the correlation between the horizontal scanning lines, hence if an image signal in which this correlation does not exist is input, an error will be generated in the comb filter.

In this case, the error is detected by a circuit consisting of IC18 and IC41, and the Y signal of the composite signal from which the chroma signal was removed by the LC trap circuit is selected by a switch circuit (IC1). The C signal obtained as a result of Y/C separation is input to a switch circuit (IC11). Here, input switching between composite and S-VHS takes place and also the 0H chroma signal is selected by the bandpass filter during the abovementioned applicability detection. The resulting signal is input to the automatic chroma level control circuit (ACC) IC36 which operates based on the burst level.

If ACC is not performed, the signal is selected by a switch circuit (IC29) via phase adjuster Q46, then level-controlled by a level control circuit (IC30, IC31, Q47, Q48) and input to a decoder (IC41).

This chroma level control circuit operates when the level of the abovementioned S-Y signal is being controlled, hence S-C is controlled at the same time.

Either the S-C signal or the 0H signal is selected by a switch circuit (IC10) depending on the S/C mode, and the selected signal is input to the decoder as a burst signal.

The VCO circuit (IC3, XTAL1) which generates a frequency of 4SC causes SC to be generated continuously in synchronism with this burst signal. As a result, the input signal is decoded into R-Y and B-Y signals.

This SC is frequency-converted into 3SC and 2SC by IC25 and IC26, respectively. These signals are used as the CCD clock and also for modulating the 1 H delay signal, respectively.

The R-Y and B-Y signals are level-adjusted by buffer amplifiers (Q27 and Q28) and (Q31 and Q32), then sent through a low-pass filter to a feedback clamp circuit (IC15, IC16, Q29, Q30, Q33, Q34) where they are DC-clamped. They are then passed through A/D converters (IC17, IC20), resulting in 8-bit digital signals which are sent to the digital board.

The A/D clock is 13.5 MHz. The outputs from the two A/D converters are switched each time a clock pulse appears, hence the R-Y and B-Y digital signals are output alternately in time division, as digital signals in a single system.

The Y output from the abovementioned Y signal switch (IC1) is also used as a sync signal.

The Y signal which is amplified by a buffer amplifier (Q3, Q4) passes through a low-pass filter, and the leading edge of each sync signal is maintained at a constant value by a sync chip clamp circuit (IC2, IC13, D2). Also, the pedestal level is detected by the pedestal level detection circuit (IC12, IC13), hence the sync-separation circuit (IC18) always operates at a point mid-way between the leading edge of the sync signal and the pedestal level.

The separated sync signal is output as an HD pulse after the effect of noise, etc., has been reduced by passing it through a H-pulse detection circuit (IC42, IC43, IC50), which only picks up the pulse width of the H sync signal.

The clock at the A/D and memory write sides is generated by a VCO circuit (IC27, D10).

The clock pulses are devided into the H frequency at the digital card, then input to the H phase comparator circuit (IC43, Q50, Q51), and phase-compared with the H sync signal of the video input.

The resulting phase error signal is fed back to the VCO circuit in order to control the frequency.

The error signal which is output by comparizon of pulse width variation at IC43 is converted to a voltage values by an integrator circuit consisting of Q50 and Q51, and the error signal which is sample-held in IC35 is amplified by IC34 and used to control the VCO.

The shuttle mode detection circuit (IC47, IC23) detects changes in the H frequency of the input sync signal, thus detecting FF/REW and enabling a stable clock to be obtained.

3.1.2 Output process

At the digital board, the digital Y signal read out from the memory is converted into an analog signal by a D/A converter (IC66).

The Y signal which is blanked and switched to a constant pedestal voltage during the blanking period by a switch circuit (IC65) passes through a buffer amplifier (Q61, Q62), then through a low-pass filter and buffer amplifier (Q59, Q60), to the output circuit.

This Y signal is first output by a drive amplifier (Q74, Q75), as the Y signal for the color difference signal.

This drive amplifier detects the DC level of the leading edge of the sync signal, and feedback-controls the DC bias, thus fixing the video output pedestal DC level.

If the level of the sync signal is changed, it is necessary to perform re-adjustment.

The Y signal which has been phase-adjusted to the same phase as the chroma signal by a delay line (DL2) is turned into a 2-output S-Y output by a drive amplifier (Q76 to Q79).

This signal is common to the abovementioned Y output DC bias control circuit.

The digital chroma signal from the memory board is converted into an analog signal by an A/D converter (IC76).

However, the R-Y and B-Y signals are output alternately in a time-division condition for each clock pulse, hence the two kinds of signals are selected by a switch circuit (IC72, IC73) and separated.

Also, blanking is inserted here, as in the case of the Y signal.

The color difference signals that are amplified by buffer amplifiers (Q69 and Q68) and (Q86 and Q87), respectively, are passed through a low-pass filter, and output by an output drive amplifier (IC75, IC71, Q84, Q67).

A sync signal can also be added to the PR output by means of a jumper. In this case, the DC bias of the output will change, hence it is necessary to re-adjust it with VR59 (PR DC).

The DC level of the PR and PB signals is fixed by a feedback clamp circuit consisting of IC69, IC70 and IC68. Each signal is UV-modulated by means of a chroma modulation circuit (IC63, IC64), and both modulated outputs are added, resulting in the C signal.

A burst signal is added to the C signal by a switch circuit (IC62). The resulting signal passes through a filter circuit and is then amplifier by a buffer amplifier (Q53, Q24).

This signal is drive-amplified by the S-C drive amplifier (Q70 to Q73) and then output.

The Y signal that passes through the delay line (DL2) of the abovementioned Y signal output circuit is added to the C signal at VR50 (YC BAL) which is used to adjust the Y/C level balance. The resulting signal is the composite video signal.

This signal is then amplified and level-adjusted by a buffer amplifier (Q65, Q66), then passed through a drive amplifier (Q81 to Q83, Q87) to become a 2-output composite output.

3.2 Digital Card

The digital card (A2-4371) sends database error-corrected digital signals to the D/A converter in the process card by writing the digital brightness and color signals that were A/D-converted in the process card to a 1 Mbit field memory using a clock synchronized with the input video signal, and also reading these signals from the memory using a clock synchronized with an external reference input signal (GENLOCK).

This card also has a genlock circuit which generates pulses synchronized with the external reference input signal. When the external reference signal is input, this circuit generates pulses in synchronism with the external reference signal that are then added to the output video signals including the sync signal and sub-carrier. When the external reference input signal is not input, the pulses are generated in synchronism with the internal reference clock.

This board consists of the following circuits.

- Dropout correction circuit.
- Write memory control circuit
- Memory circuit
- Read memory control circuit
- Read data circuit
- Genlock circuit
- Control circuit

3.2.1 Droppput compensation circuit

The signals that are converted into digital signals by the A/D converter in the process card are input to the dropout correction 1H memory (17D, 18 D). Normally, these input digital video signals are output from this circuit without change. If a dropout is detected, the output signal of the 1H memory (signal 1H prior to the dropout) is written directly to the 1H memory, and the 1H memory output signal is output from this circuit. Consequently, during the interval in which a dropout is detected, the signal 1H before the dropout is output, and is written to the 1H memory as well. As a result, the signal that dropped out is replaced by the signal 1H prior to the dropout, thus compensating for the dropout.

3.2.2 Write memory control circuit

This circuit generates write timing pulses and sends them to the 1 Mbit field memory (3J, 3K, 5J, 5K, 8J, 8K, 10J and 10K). Consequently, this circuit consists of line counters (4E and 6E) for generating these pulses, horizontal counters (15E and 16E), field identification circuits (17E and 18E), a freeze control circuit (11E), an input pulse control circuit (13E), and a memory control pulse generator circuit (7E).

The write clock received from the process card is counted by the horizontal counter and the reset pulse obtained is sent back to the horizontal phase comparator circuit in the process card, resulting the PLL circuit.

A horizontal sync pulse which is synchronized with the input video signal is obtained from this PLL circuit and counted, making a line counter.

The vertical sync is separated from WSYNC which is received from the process card, becoming the reset pulse of the line counter. The outputs from these counters, together with the outputs from the field identification circuit, freeze control circuit and input pulse circuit are used to generate the memory control pulses in the memory control pulse generator circuit.

3.2.3 Memory circuit

This circuit consist of eight 1 Mbit field memories (CXK1206). The digital video signal, consisting of an 8-bit brightness signal and an 8-bit color signal, which has been A/D-converted in the process card then passed through the dropout correction circuit is written to this memory. The digital video signal read out from this memory passes through the read data circuit to the D/A converter in the processor card. The top four bits of the brightness signal are assigned to 3J and 5J of the memory, and the bottom four bits to 3K and 5K. Also, the top four bits of the color signal are assigned to 8J and 10J, and the bottom four bits to 8K and 10K. These pairs of memory groups are read alternately for each field.

These memories are controlled by control pulses which are received from the write control circuit and the read memory control circuit.

3.2.4 Read memory control circuit

This circuit generates timing pulses in order to read out signals from the 1 Mbit field memory. Consequently, it consists of line counters (4H and 6H) which generate these pulses, horizontal counters (6F,7F and 8F), read field control circuits (5H and 8H), an input pulse control circuit (9H) and a memory control pulse generator circuit (7H).

The read clock pulses generated by the read clock oscillator (X4) are counted by the horizontal counter, and the reset pulses obtained are phase-compared with the horizontal sync of the external reference input signal by a phase comparator (2D). In this way, this part functions as a PLL circuit. This PLL circuit generates the read clock and horizontal sync pulses in synchronism with the external reference input signal, and also counts these horizontal sync pulses, thus functioning as a line counter. The read field control circuit detects the difference between the fields of the input video signals and the external reference input signals, and controls the rear field in order to eliminate the phenomenon of "overtaking and being overtaken" which occurs when the write point to the memory and the read point approach each other. The memory control pulses are generated in the memory control pulse generator circuit using the output from these counters and also the outputs from the read field control circuit and input pulse control circuit, respectively.

3.2.5 Read data circuit

In this circuit, the brightness signal read from the 1 Mbit field memory is delayed in a phase shifter (16F) for the purpose of correcting the Y/C phase. Also, the arithmetic mean of the color signal is taken each 1H for the purpose of noise reduction, and sent to the D/A converter of each process card. The amount of shift of the brightness signal for correcting the Y/C phase can be varied with the rotary switch (SW3) on the front and also the internal DIP switch (SW9). This internal DIP switch is set to the correct value at the factory. Do not touch it, therefore, under normal conditions. Either a signal delayed by 1H or a non-delayed signal can be selected as the brightness signal to be sent to the process card. By setting "Y 1H DELAY" of SW2 on the front panel to ON, a signal delayed by 1H will be selected.

A minute error occurs in the input color signal every 1H when the signal is being decoded in the decoding circuit in the process card. In order to remove this error, a circuit (11H, 13H, 14H, 14F) which calculates the arithmetic mean each 1H is provided. This arithmetic mean circuit contains a function which automatically stops the arithmetic mean operation if there is a very large error in the signal and also a function which forcibly calculates the arithmetic mean of all signals. One of these functions can be selected by means of "CNR" of SW2 on the front. By setting "CNR" of SW2 to ON, the function which forcibly calculates the arithmetic mean of all signals will be selected.

3.2.6 Genlock circuit

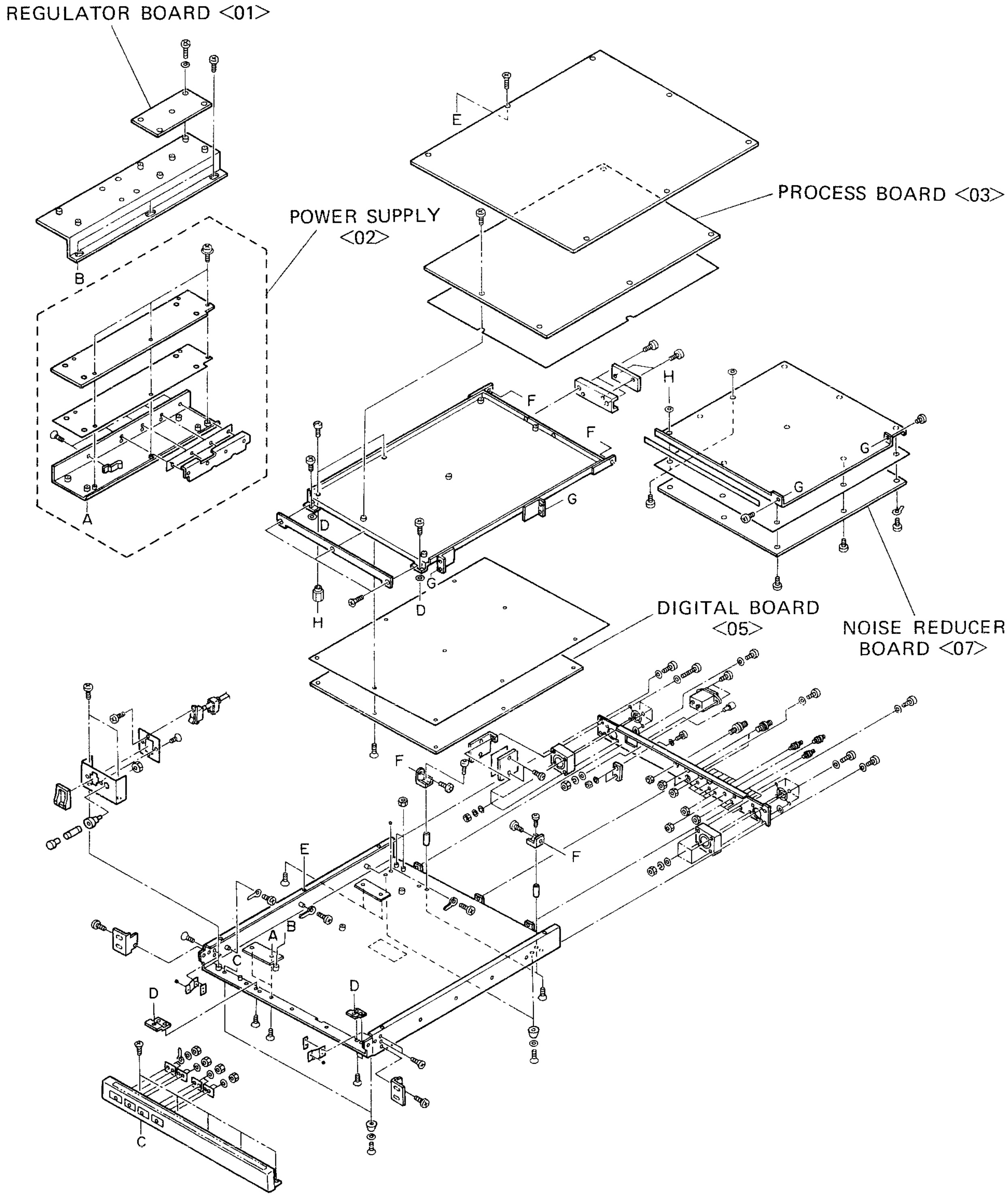
This circuit generates signals such as the sync signal which is to be added to the output signal, the advance sync, read lock, and the sub-carrier used when encoding the color difference signal, in synchronism with the external reference input signal. These signals are synchronized with the external reference input signal when the external reference input signal is input, and are automatically synchronized with the internal reference signal when the external reference signal is not input. When the external reference input signal is input, the burst component and sync component are converted into TTL level pulses by a comparator (15N). The sub-carrier which is generated by the sync generator (2B) then passed through the sub-carrier phase adjustment shifter (12B, 11B) is phase-compared with the burst component of the external reference input signal in a comparator (13M). The result of phase-comparison is sampled and held (in 8M) as an error voltage, then buffered (in 7M) and applied to the variable capacitance diode (D1) in the x4 sub-carrier oscillator. Varying the capacitance of this diode causes the oscillator frequency to change, enabling a sub-carrier that is synchronized with the external reference input signal to be obtained. The burst signal that is added to the output signal is generated in this circuit using this sub-carrier and sent to the process card. The sync component passes through the horizontal phase adjustment shifter (7D, 8B), and similarly it is phase-compared with the horizontal sync signal generated by the sync generator in a phase comparator (6B). The phase-compared result is added to variable capacitance diode (D3) of the clock generator of the sync generator then the frequency varied, in the same way as for the sub-carrier, resulting in a sync signal that is synchronized with the external reference input signal. If the external reference input signal is not input, this will be automatically sensed by the input signal non-input detection circuit (7C), and the x4 sub-carrier generator will go into a free-running condition. In this case, the clock generator of the sync generator will be synchronized with the free-running x4 sub-carrier. The advance sync is generated by the advance sync signal sync generator (9C). Also, the phase of the pulses received from the read control circuit is shifted by the video phase adjustment phase shifter (8B). These phase-shifted pulses are phase-compared with the horizontal sync pulses of the external reference input signal in phase comparator (2D), and the resulting error voltage controls the read clock generator (X4).

3.2.7 Control circuit

This circuit controls the field freeze, frame freeze, auto freeze and bypass operations. The bypass signal is sent to the process card. Switches other than the bypass switch go OFF immediately after the power is switched ON, and subsequently go alternately ON or OFF each time they are pressed. The control circuit also contains the front panel LED drive circuit and the interface circuit for the remote terminal.

SECTION 4
DIAGRAMS AND CIRCUIT BOARDS

4.1 CIRCUIT BOARD LOCATIONS

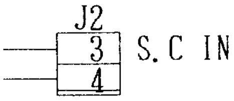

REGULATOR BOARD <01>
POWER SUPPLY <02>
PROCESS BOARD <03>
DIGITAL BOARD <05>
NOISE REDUCER BOARD <07>
A
B
C
D
E
F
G
H

4.2 Precautions to be Taken with Circuit Diagrams

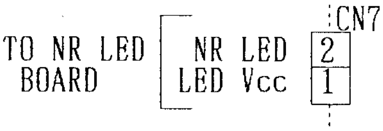
4.2.1 Connector indication

Connectors are indicated by the following two methods.

(1) This example represents pins 2 and 3 of J2.



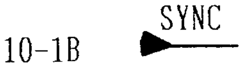
(2) This example represents pins 1 and 2 of CN7.



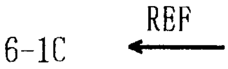
4.2.2 Indication of wire connections on the same board.

Several circuit diagrams are provided for each of VIDEO, MEMORY and NR boards. The connection of each wire on the same board is indicated on these diagrams by the following three methods.

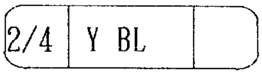
(1) This example indicates that the wire is connected to SYNC at address 1B of the 10th circuit diagram and a signal is input from SYNC.



(2) This example indicates that the wire is connected to REF at address 1C of the 6th circuit diagram and a signal is input from REF.



(3) This example indicates that the wire is connected to YBL of circuit diagram 2/4.



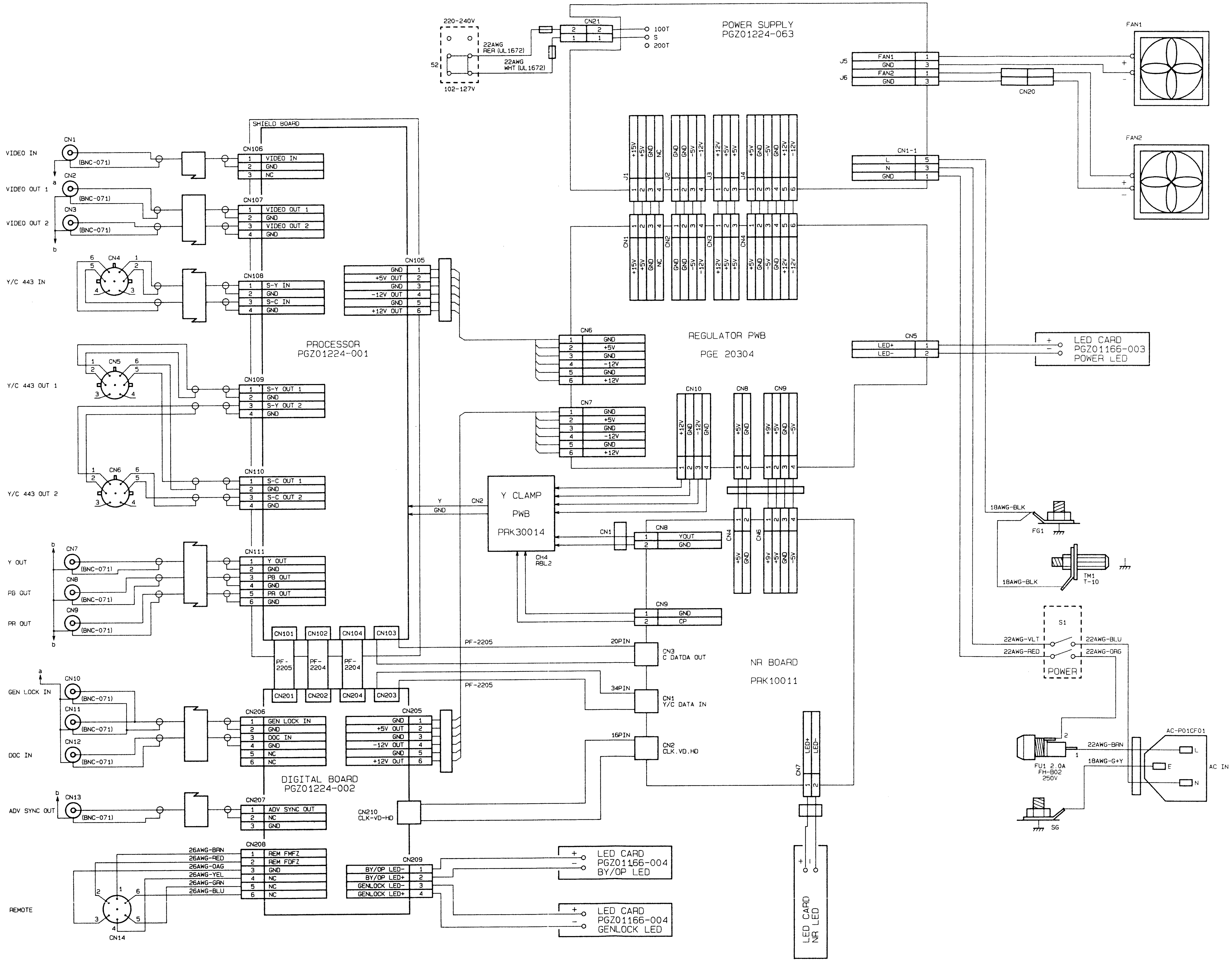
4.2.3 Connector connections

Refer to the general connection diagram for the connections of the connectors.

4.2.4 The following rules apply to circuit diagrams, unless otherwise specified.

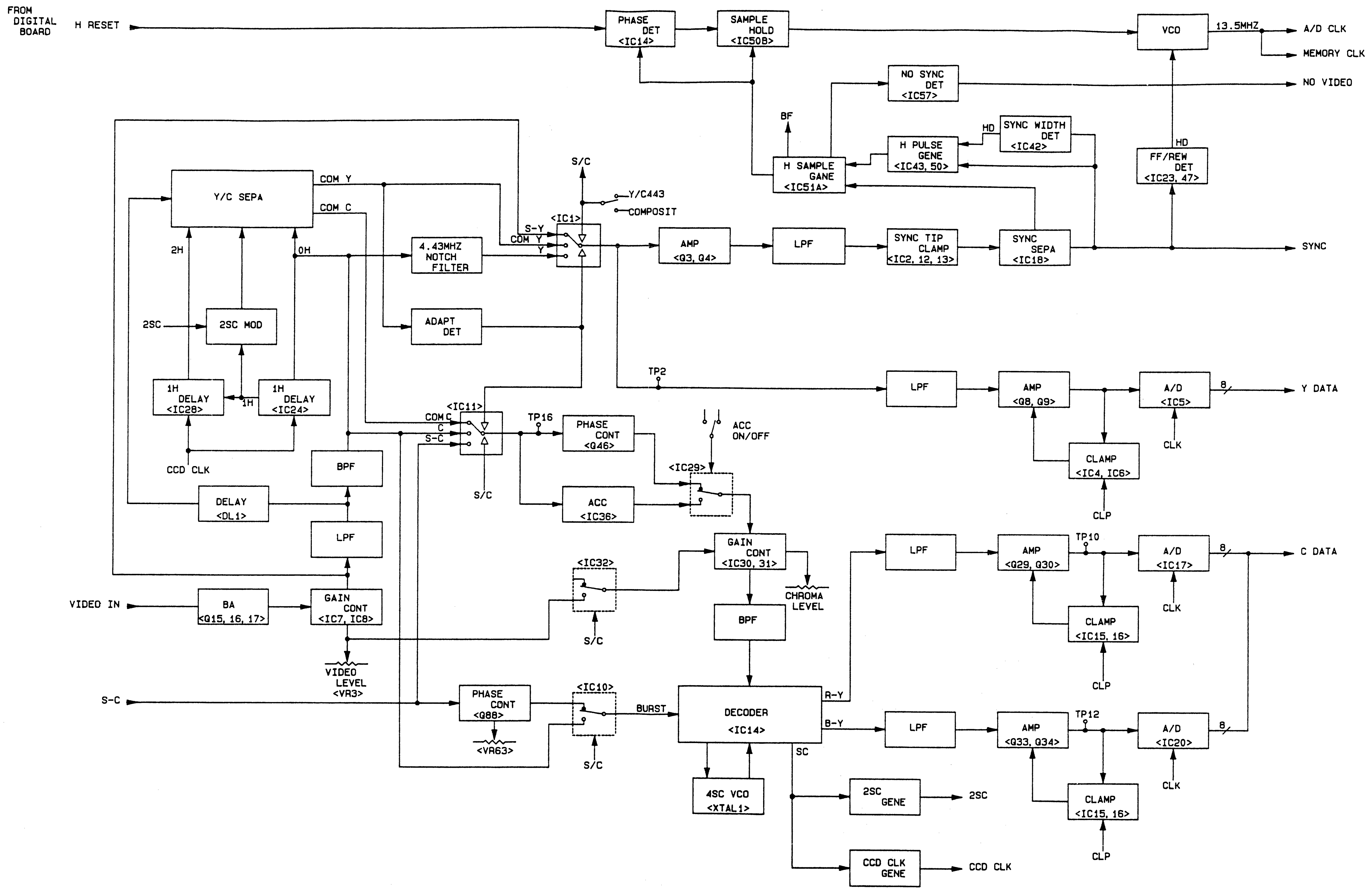
(1) Resistance is in Ω.
(2) Capacitance is in μF.
(3) Inductance is in μH.
(4) All diodes are 1SS133.

4.3 OVERALL WIRING DIAGRAM

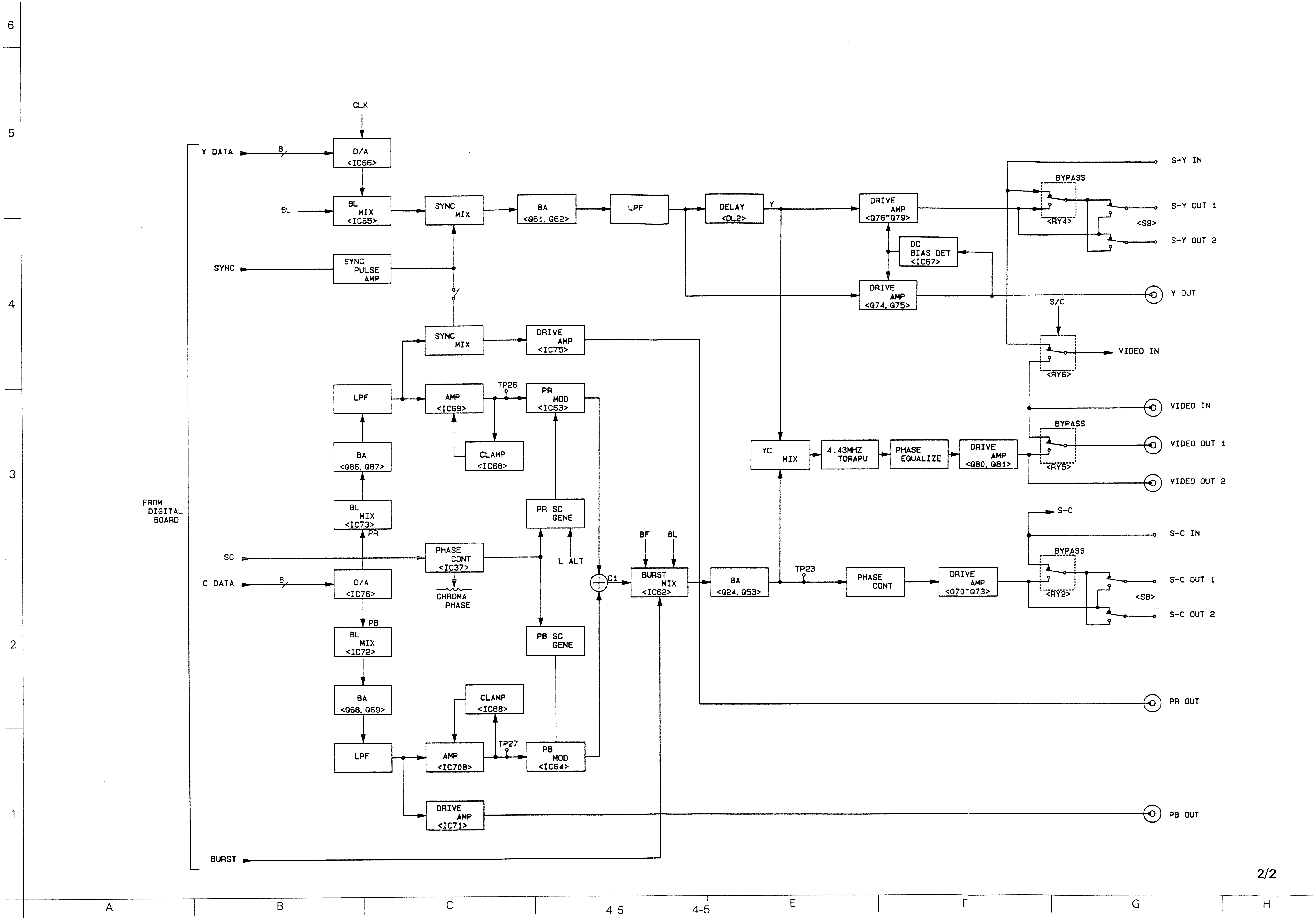


220-240V
102-127V
S2
22AWG RER (UL1672)
22AWG WHT (UL1672)
CN21
100T
S
200T
POWER SUPPLY
PGZ01224-063
J5
J6
FAN1
GND
FAN2
CN20
FAN1
FAN2
CN1-1
L
N
GND
J1
J2
J3
J4
CN1
CN2
CN3
CN4
+15V
+5V
GND
NC
-5V
-12V
+12V
REGULATOR PWB
PGE 20304
CN5
LED+
LED-
LED CARD
PGZ01166-003
POWER LED
CN6
CN7
CN10
CN8
CN9
+9V
SHIELD BOARD
VIDEO IN
VIDEO OUT 1
VIDEO OUT 2
Y/C 443 IN
Y/C 443 OUT 1
Y/C 443 OUT 2
Y OUT
PB OUT
PR OUT
GEN LOCK IN
DOC IN
ADV SYNC OUT
REMOTE
(BNC-071)
CN106
CN107
CN108
CN109
CN110
CN111
CN105
+5V OUT
-12V OUT
+12V OUT
S-Y IN
S-C IN
S-Y OUT 1
S-Y OUT 2
S-C OUT 1
S-C OUT 2
PB OUT
PR OUT
PROCESSOR
PGZ01224-001
Y CLAMP
PWB
PRK30014
CN2
CN4
RBL2
YOUT
CP
CN101
CN102
CN104
CN103
PF-2205
PF-2204
CN201
CN202
CN204
CN203
PF-2205
20PIN
CN3
C DATDA OUT
34PIN
CN1
Y/C DATA IN
16PIN
CN2
CLK,VD,HD
NR BOARD
PRK10011
CN206
GEN LOCK IN
DOC IN
CN205
DIGITAL BOARD
PGZ01224-002
CN207
ADV SYNC OUT
CN210
CLK-VD-HD
CN208
26AWG-BRN
26AWG-RED
26AWG-OAG
26AWG-YEL
26AWG-GRN
26AWG-BLU
REM FMFZ
REM FDFZ
CN14
CN209
BY/OP LED-
BY/OP LED+
GENLOCK LED-
GENLOCK LED+
LED CARD
PGZ01166-004
BY/OP LED
LED CARD
PGZ01166-004
GENLOCK LED
CN7
LED CARD
NR LED
18AWG-BLK
FG1
TM1
T-10
S1
22AWG-VLT
22AWG-RED
22AWG-BLU
22AWG-ORG
POWER
AC-P01CF01
22AWG-BRN
18AWG-G+Y
FU1 2.0A
FH-B02
250V
AC IN
L
E
N
SG

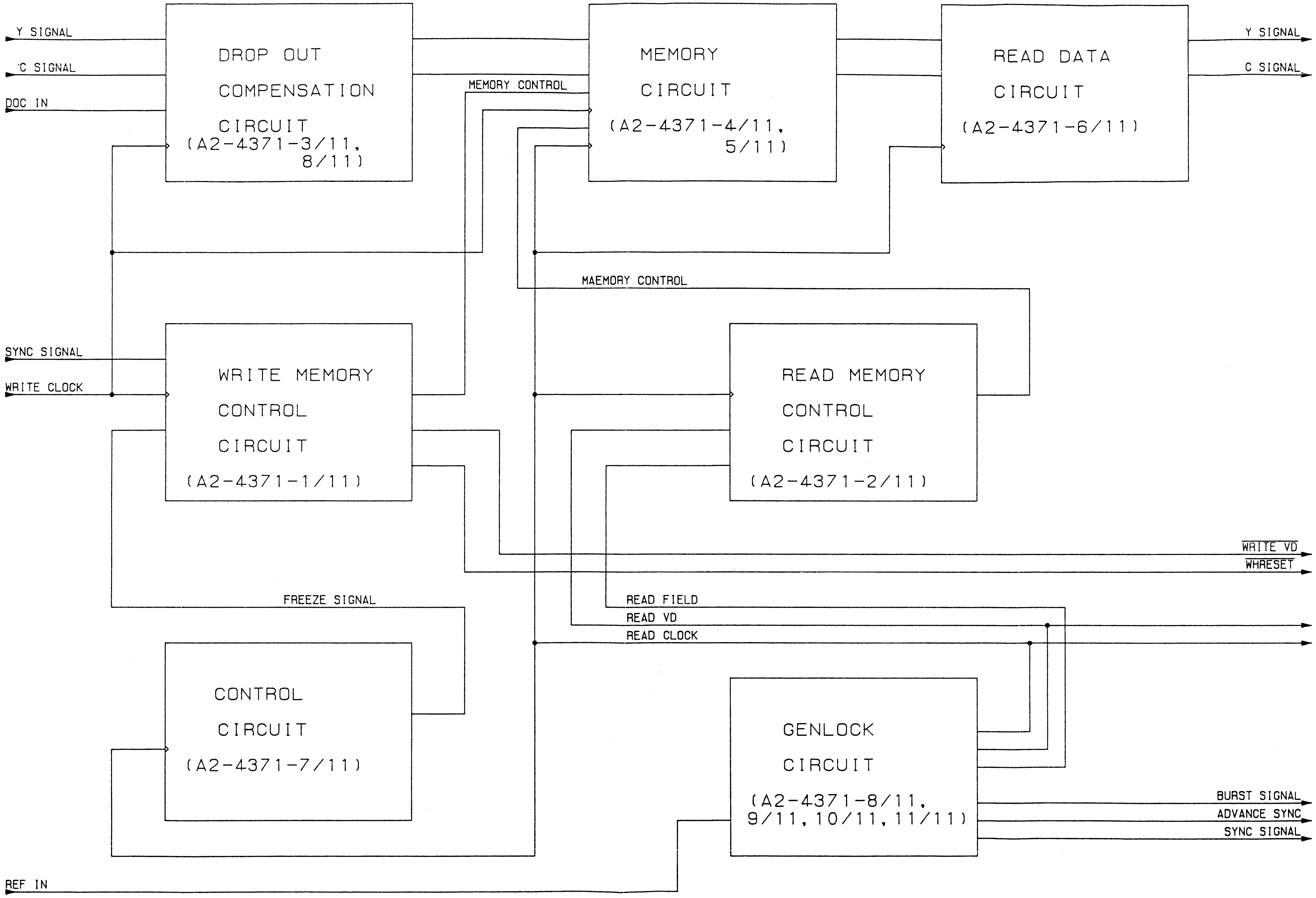
4.4 PROCESS BLOCK DIAGRAM


FROM DIGITAL BOARD
H RESET
PHASE DET <IC14>
SAMPLE HOLD <IC50B>
VCO
13.5MHZ
A/D CLK
MEMORY CLK
NO SYNC DET <IC57>
NO VIDEO
BF
SYNC WIDTH DET <IC42>
HD
H PULSE GENE <IC43, 50>
H SAMPLE GANE <IC51A>
FF/REW DET <IC23, 47>
HD
Y/C SEPA
COM Y
COM C
S/C
Y/C443
COMPOSIT
<IC1>
S-Y
COM Y
Y
2H
0H
4.43MHZ NOTCH FILTER
AMP <Q3, Q4>
LPF
SYNC TIP CLAMP <IC2, 12, 13>
SYNC SEPA <IC18>
SYNC
2SC
2SC MOD
ADAPT DET
1H DELAY <IC28>
1H
1H DELAY <IC24>
TP2
LPF
AMP <Q8, Q9>
A/D <IC5>
8
Y DATA
CLK
CLAMP <IC4, IC6>
CLP
<IC11>
COM C
C
S-C
TP16
PHASE CONT <Q46>
ACC ON/OFF
<IC29>
CCD CLK
BPF
S/C
DELAY <DL1>
ACC <IC36>
LPF
GAIN CONT <IC30, 31>
CHROMA LEVEL
LPF
AMP <Q29, Q30>
TP10
A/D <IC17>
8
C DATA
CLK
CLAMP <IC15, 16>
CLP
<IC32>
VIDEO IN
BA <Q15, 16, 17>
GAIN CONT <IC7, IC8>
S/C
BPF
VIDEO LEVEL <VR3>
S-C
PHASE CONT <Q88>
<VR63>
<IC10>
BURST
S/C
DECODER <IC14>
R-Y
B-Y
SC
LPF
AMP <Q33, Q34>
TP12
A/D <IC20>
8
CLK
CLAMP <IC15, 16>
CLP
4SC VCO <XTAL1>
2SC GENE
2SC
CCD CLK GENE
CCD CLK

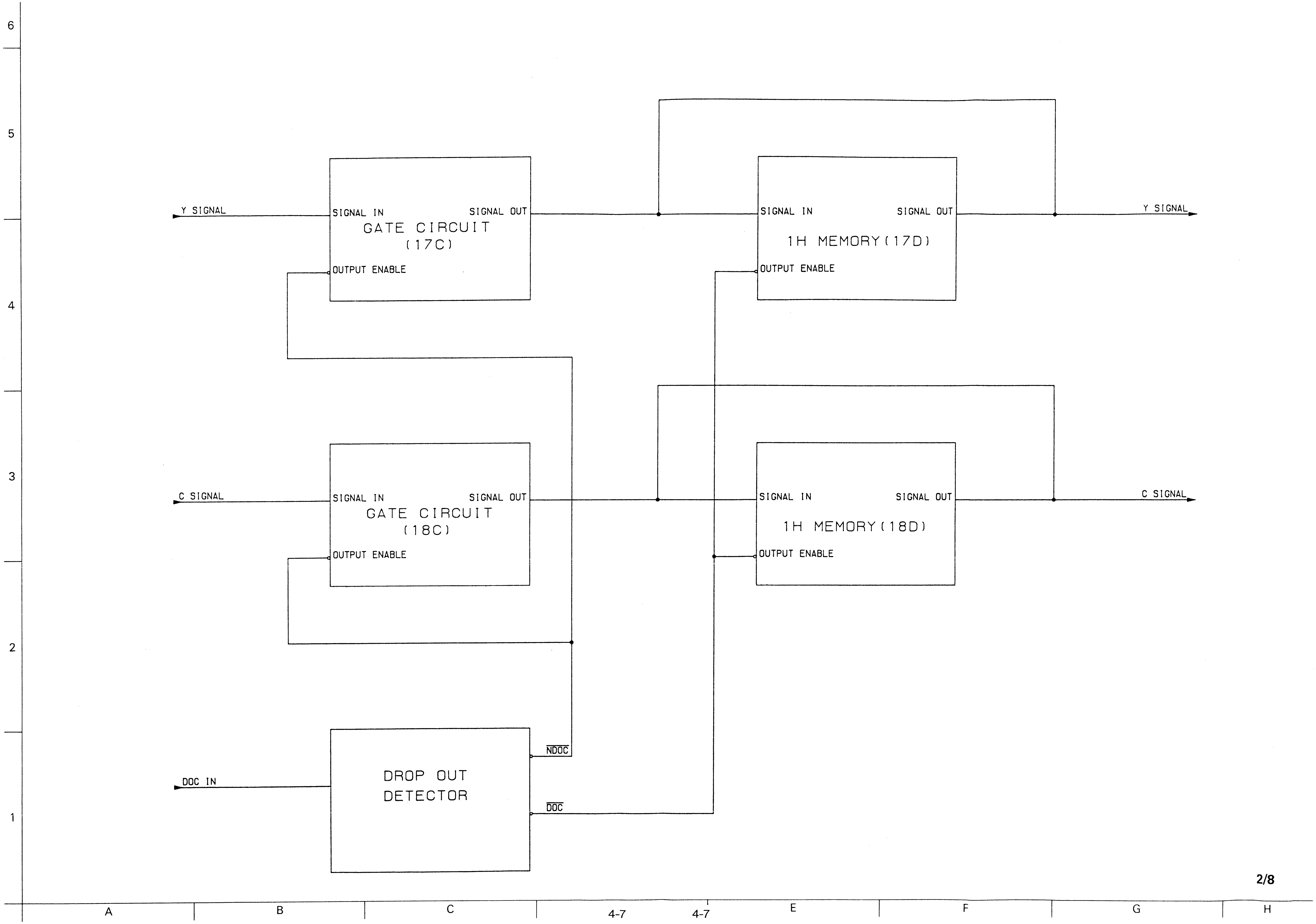
1/2


CLK
Y DATA
8
D/A
<IC66>
BL
BL MIX
<IC65>
SYNC MIX
BA
<Q61, Q62>
LPF
DELAY
<DL2>
Y
DRIVE AMP
<Q76~Q79>
S-Y IN
BYPASS
<RY4>
S-Y OUT 1
<S9>
S-Y OUT 2
DC BIAS DET
<IC67>
SYNC
SYNC PULSE AMP
DRIVE AMP
<Q74, Q75>
Y OUT
S/C
SYNC MIX
DRIVE AMP
<IC75>
VIDEO IN
<RY6>
LPF
AMP
<IC69>
TP26
PR MOD
<IC63>
VIDEO IN
BYPASS
BA
<Q86, Q87>
CLAMP
<IC68>
YC MIX
4.43MHZ TORAPU
PHASE EQUALIZE
DRIVE AMP
<Q80, Q81>
<RY5>
VIDEO OUT 1
VIDEO OUT 2
FROM DIGITAL BOARD
BL MIX
<IC73>
PR
PR SC GENE
S-C
S-C IN
SC
PHASE CONT
<IC37>
L ALT
BF
BL
BYPASS
C DATA
8
D/A
<IC76>
CHROMA PHASE
C1
BURST MIX
<IC62>
BA
<Q24, Q53>
TP23
PHASE CONT
DRIVE AMP
<Q70~Q73>
<RY2>
S-C OUT 1
<S8>
S-C OUT 2
PB
BL MIX
<IC72>
PB SC GENE
BA
<Q68, Q69>
CLAMP
<IC68>
PR OUT
LPF
AMP
<IC70B>
TP27
PB MOD
<IC64>
DRIVE AMP
<IC71>
PB OUT
BURST
6
5
4
3
2
1
A
B
C
4-5
4-5
E
F
G
H

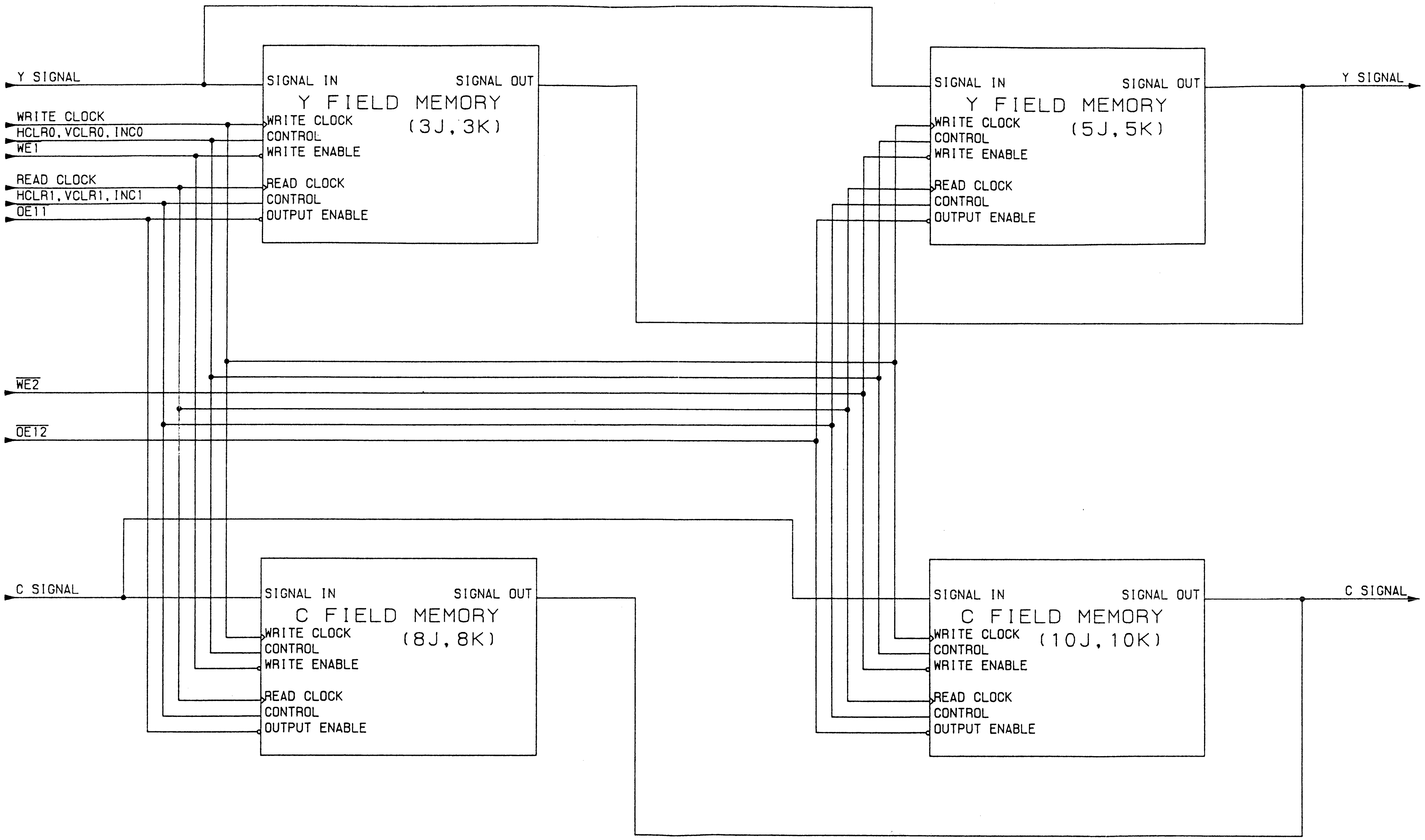
4.5 DIGITAL BLOCK DIAGRAM

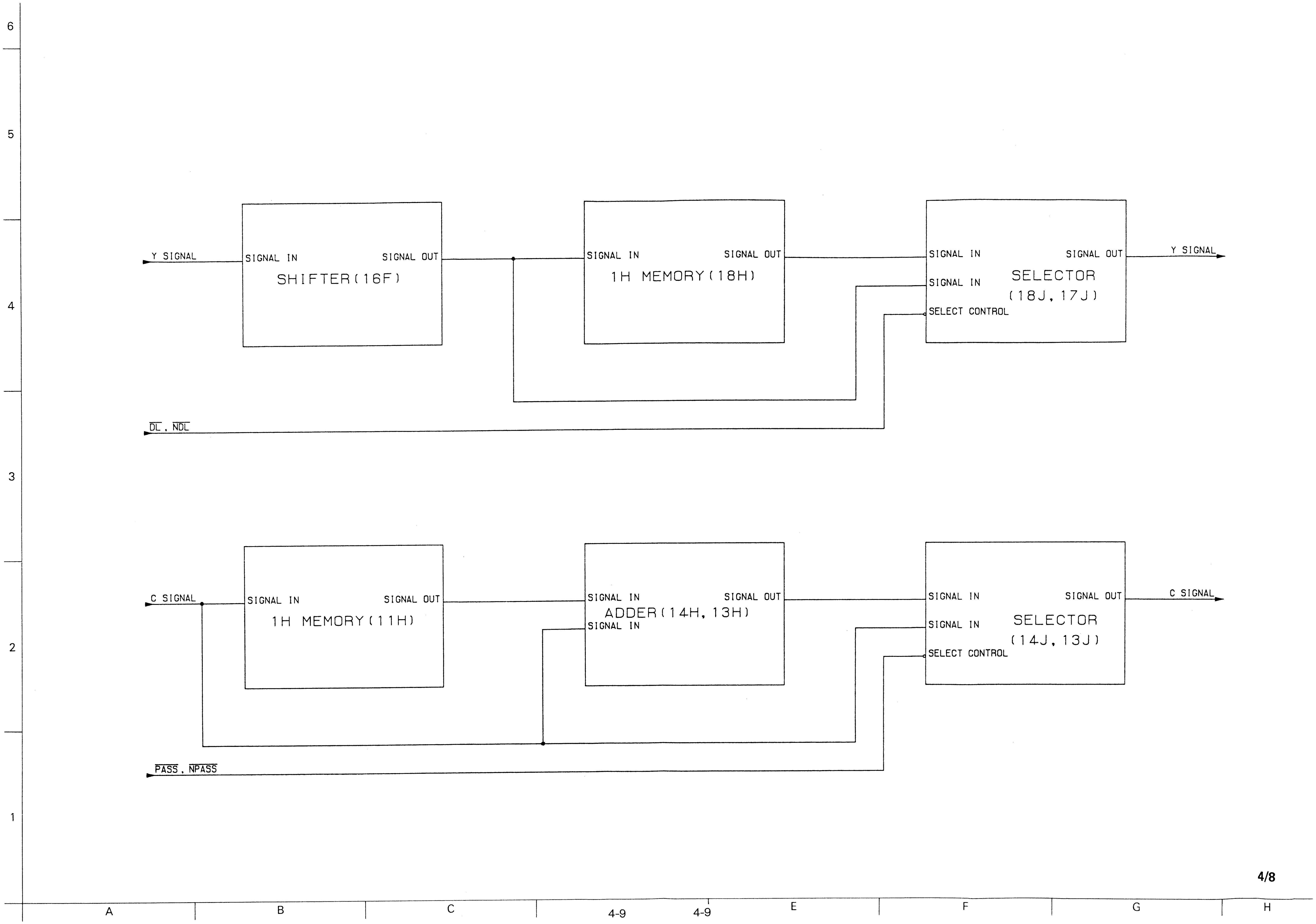


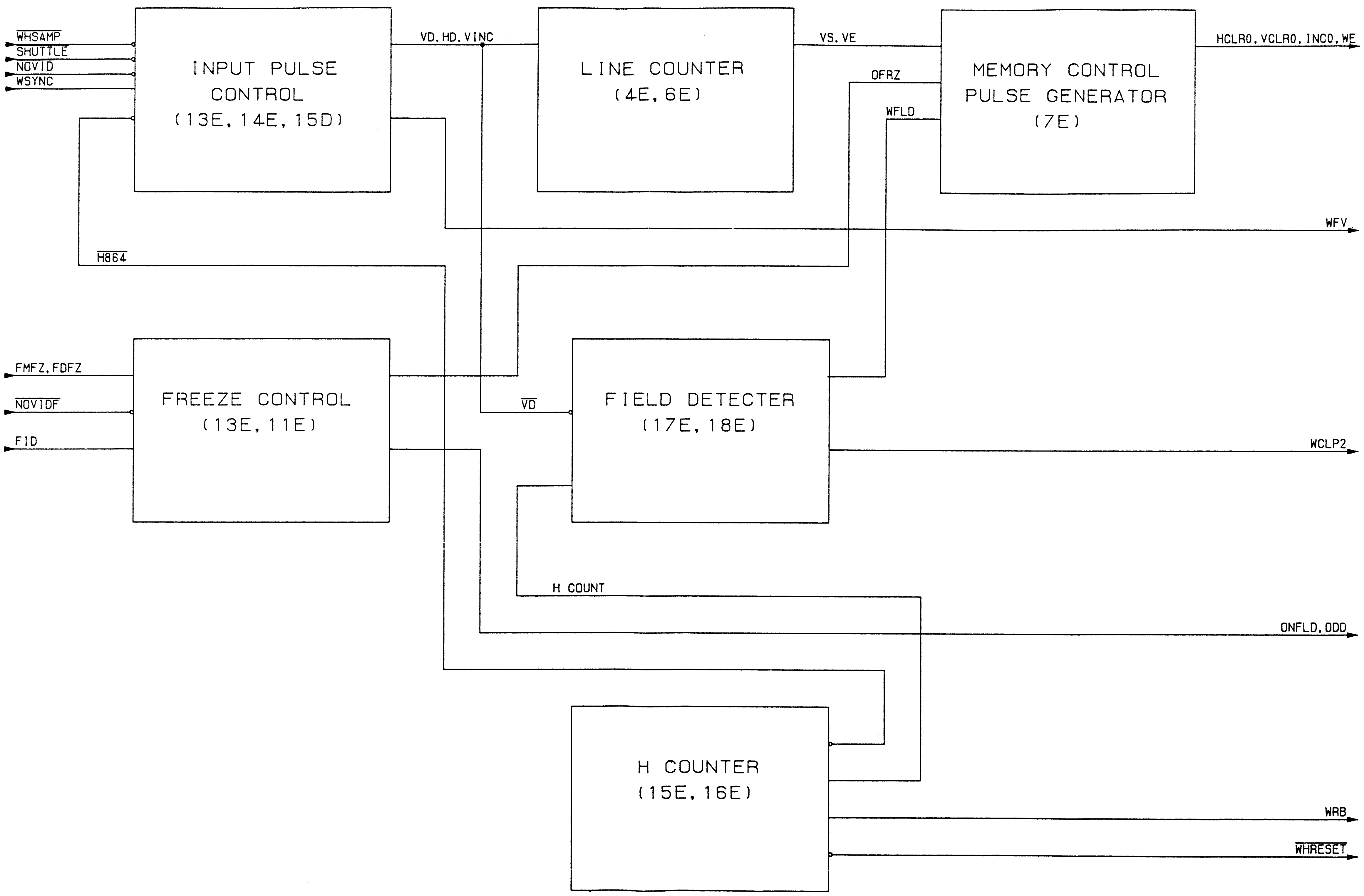
Y SIGNAL
C SIGNAL
DOC IN
DROP OUT
COMPENSATION
CIRCUIT
(A2-4371-3/11,
8/11)
MEMORY CONTROL
MEMORY
CIRCUIT
(A2-4371-4/11,
5/11)
READ DATA
CIRCUIT
(A2-4371-6/11)
Y SIGNAL
C SIGNAL
MAEMORY CONTROL
SYNC SIGNAL
WRITE CLOCK
WRITE MEMORY
CONTROL
CIRCUIT
(A2-4371-1/11)
READ MEMORY
CONTROL
CIRCUIT
(A2-4371-2/11)
WRITE VD
WHRESET
FREEZE SIGNAL
READ FIELD
READ VD
READ CLOCK
CONTROL
CIRCUIT
(A2-4371-7/11)
GENLOCK
CIRCUIT
(A2-4371-8/11,
9/11, 10/11, 11/11)
BURST SIGNAL
ADVANCE SYNC
SYNC SIGNAL
REF IN

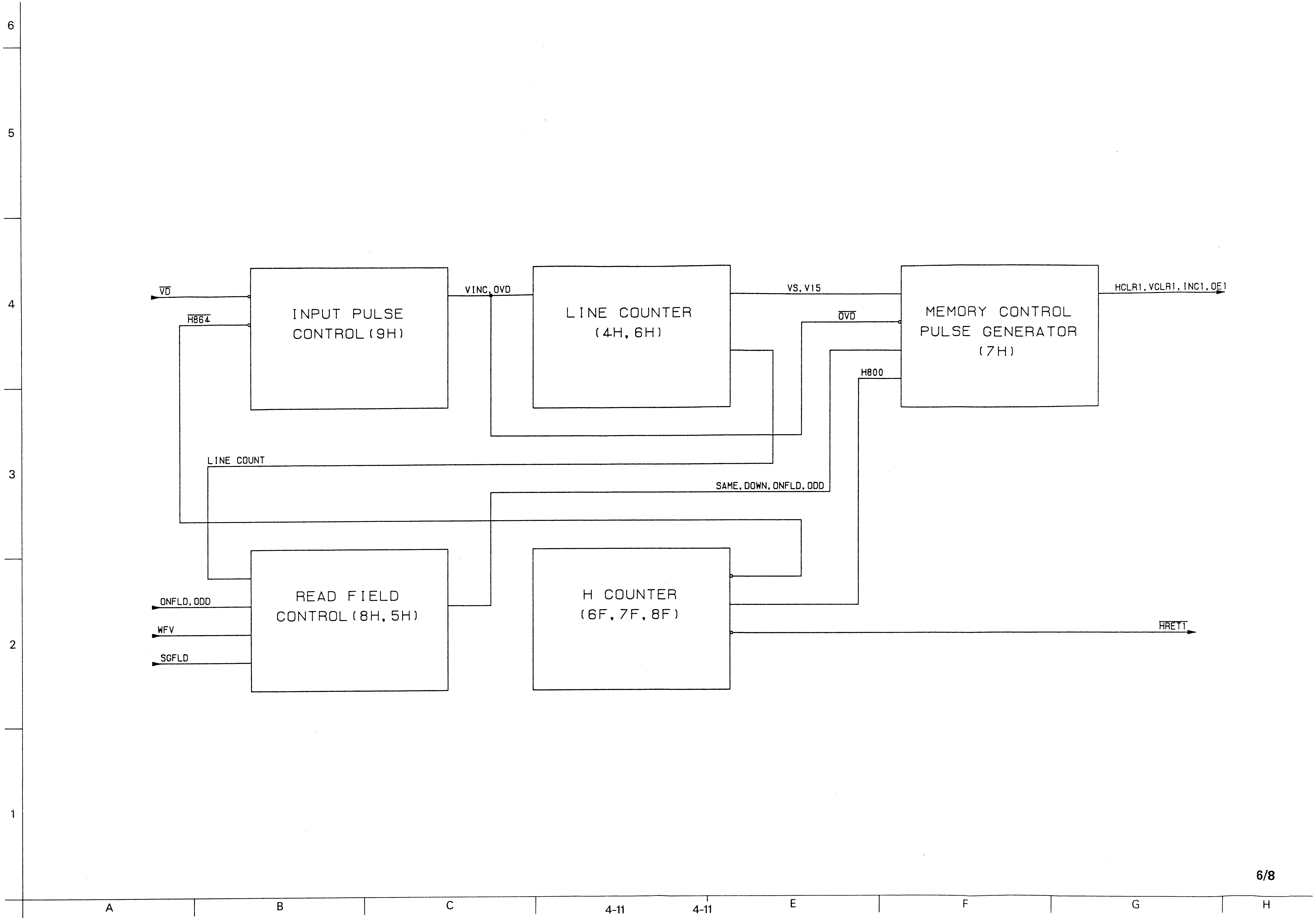


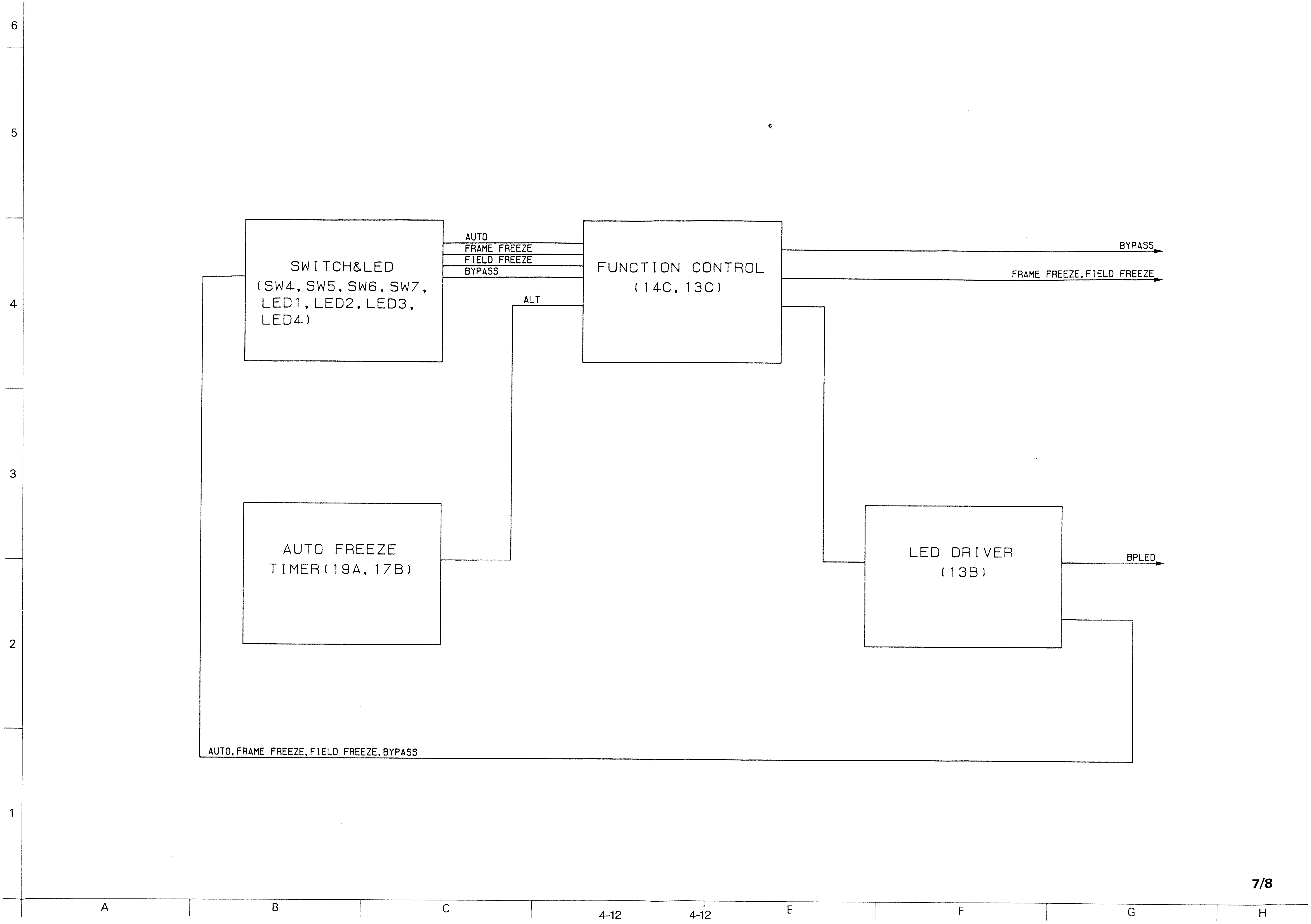
6
5
4
3
2
1
Y SIGNAL
SIGNAL IN
SIGNAL OUT
GATE CIRCUIT
(17C)
OUTPUT ENABLE
SIGNAL IN
SIGNAL OUT
1H MEMORY(17D)
OUTPUT ENABLE
Y SIGNAL
C SIGNAL
SIGNAL IN
SIGNAL OUT
GATE CIRCUIT
(18C)
OUTPUT ENABLE
SIGNAL IN
SIGNAL OUT
1H MEMORY(18D)
OUTPUT ENABLE
C SIGNAL
DOC IN
DROP OUT
DETECTOR
$\overline{NDOC}$
$\overline{DOC}$
A
B
C
4-7
4-7
E
F
G
H

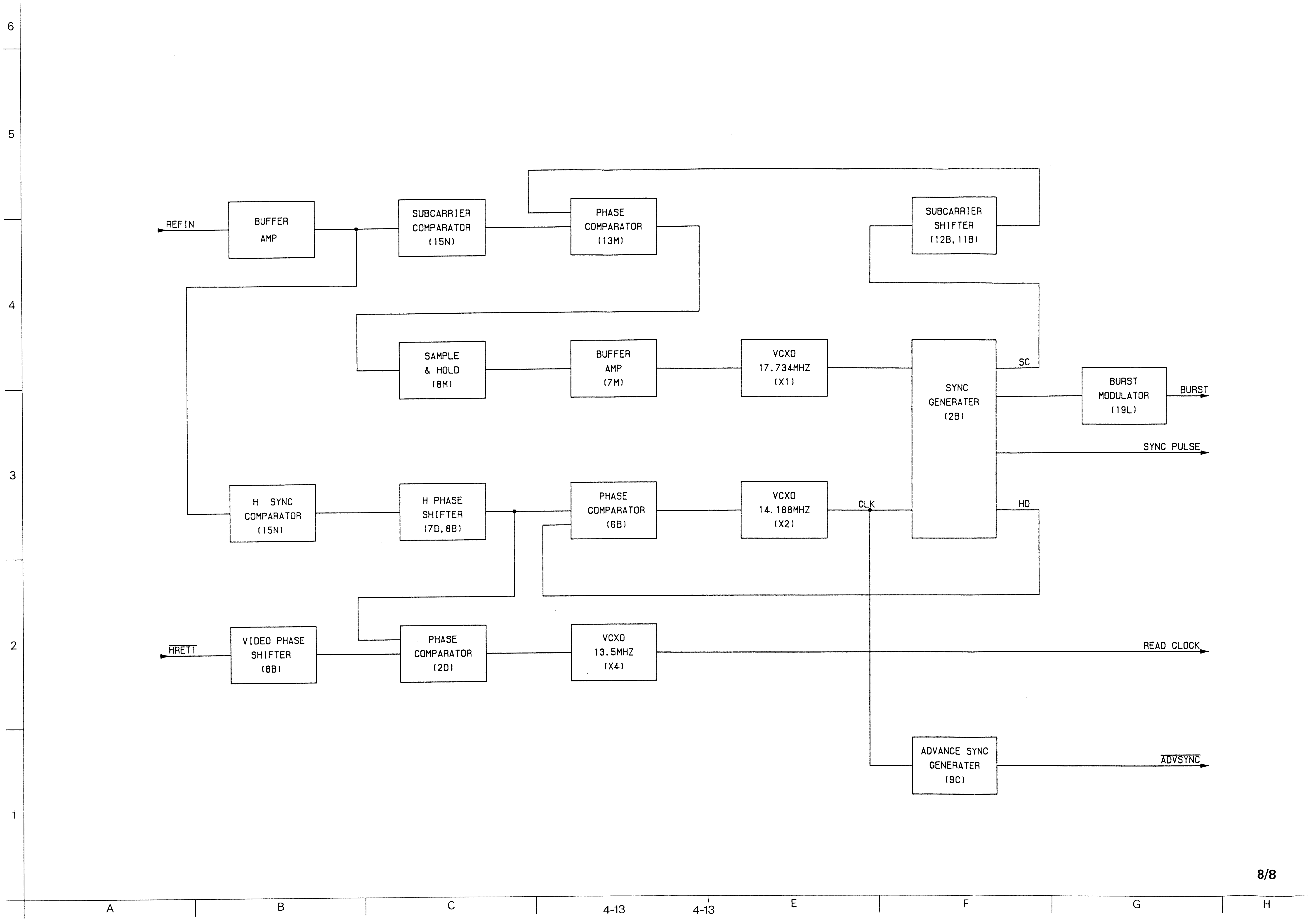

Y SIGNAL
WRITE CLOCK
HCLR0, VCLR0, INC0
WE1
READ CLOCK
HCLR1, VCLR1, INC1
OE11
WE2
OE12
C SIGNAL
SIGNAL IN
SIGNAL OUT
Y FIELD MEMORY
(3J, 3K)
WRITE CLOCK
CONTROL
WRITE ENABLE
READ CLOCK
CONTROL
OUTPUT ENABLE
Y FIELD MEMORY
(5J, 5K)
C FIELD MEMORY
(8J, 8K)
C FIELD MEMORY
(10J, 10K)
Y SIGNAL
C SIGNAL


6
5
4
3
2
1
Y SIGNAL
SIGNAL IN
SIGNAL OUT
SHIFTER(16F)
SIGNAL IN
SIGNAL OUT
1H MEMORY(18H)
SIGNAL IN
SIGNAL OUT
SIGNAL IN
SELECTOR
(18J, 17J)
SELECT CONTROL
Y SIGNAL
$\overline{DL}$, $\overline{NDL}$
C SIGNAL
SIGNAL IN
SIGNAL OUT
1H MEMORY(11H)
SIGNAL IN
SIGNAL OUT
ADDER(14H, 13H)
SIGNAL IN
SIGNAL IN
SIGNAL OUT
SIGNAL IN
SELECTOR
(14J, 13J)
SELECT CONTROL
C SIGNAL
$\overline{PASS}$, $\overline{NPASS}$
A
B
C
4-9
4-9
E
F
G
H

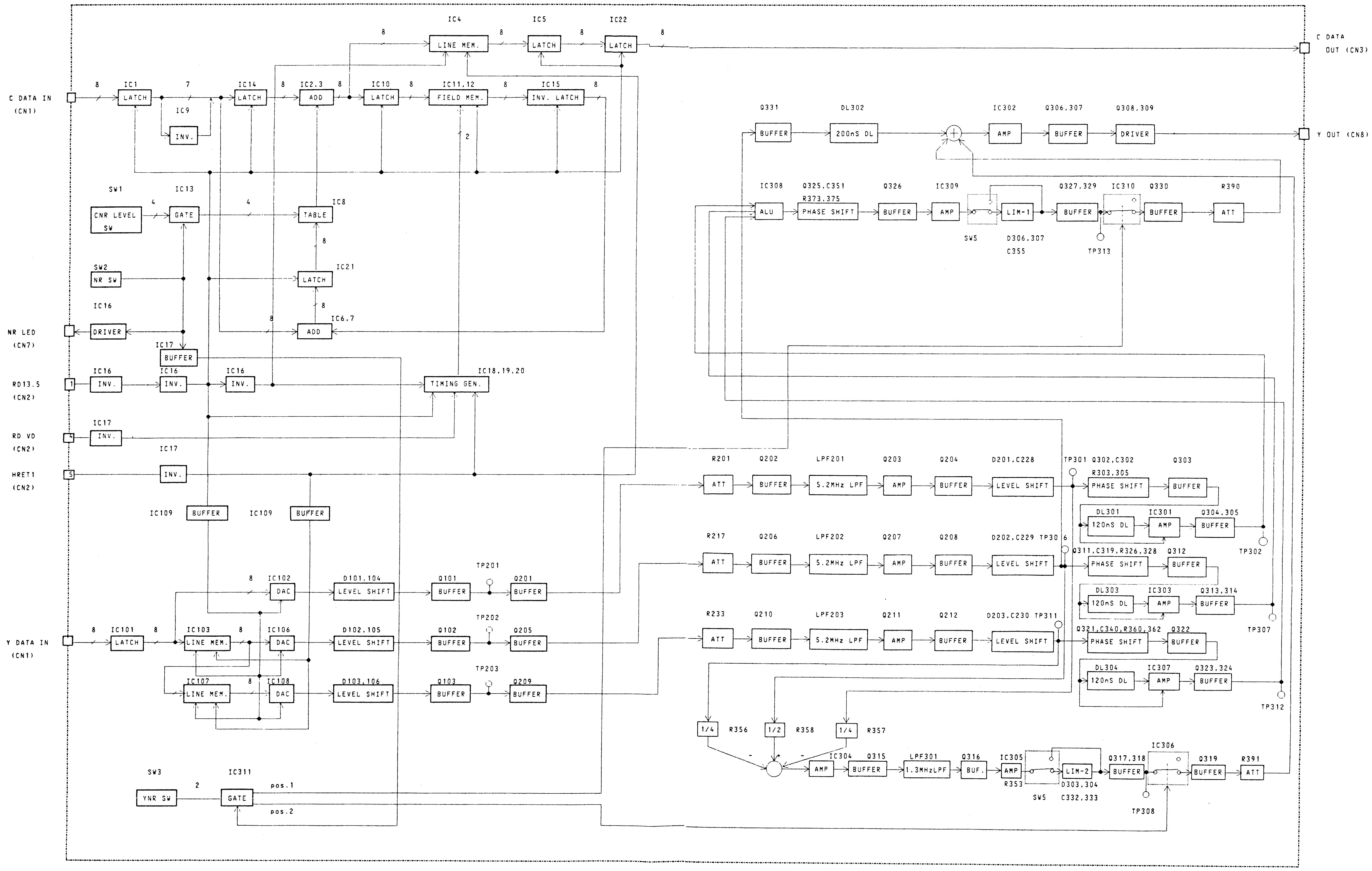

INPUT PULSE CONTROL (13E, 14E, 15D)
LINE COUNTER (4E, 6E)
MEMORY CONTROL PULSE GENERATOR (7E)
FREEZE CONTROL (13E, 11E)
FIELD DETECTER (17E, 18E)
H COUNTER (15E, 16E)
WHSAMP
SHUTTLE
NOVID
WSYNC
VD, HD, VINC
VS, VE
OFRZ
WFLD
HCLR0, VCLR0, INC0, WE
WFV
H864
FMFZ, FDFZ
NOVIDF
FID
VD
WCLP2
H COUNT
ONFLD, ODD
WRB
WHRESET


VD
H864
INPUT PULSE CONTROL (9H)
VINC, OVD
LINE COUNTER (4H, 6H)
VS, V15
OVD
H800
MEMORY CONTROL PULSE GENERATOR (7H)
HCLR1, VCLR1, INC1, OE1
LINE COUNT
SAME, DOWN, ONFLD, ODD
ONFLD, ODD
WFV
SGFLD
READ FIELD CONTROL (8H, 5H)
H COUNTER (6F, 7F, 8F)
HRET1
6
5
4
3
2
1
A
B
C
E
F
G
H

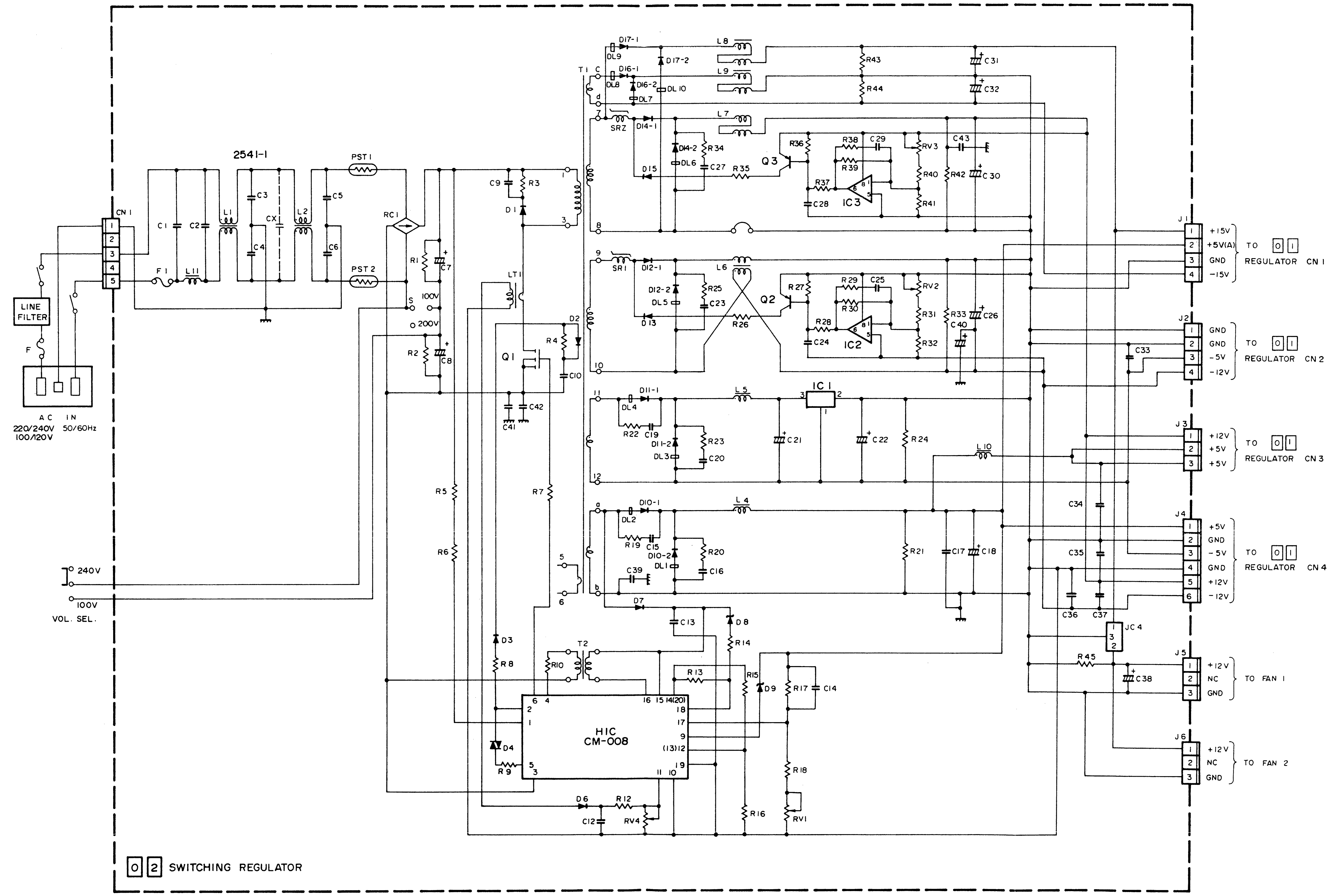

SWITCH&LED
(SW4, SW5, SW6, SW7,
LED1, LED2, LED3,
LED4)
AUTO
FRAME FREEZE
FIELD FREEZE
BYPASS
FUNCTION CONTROL
(14C, 13C)
ALT
BYPASS
FRAME FREEZE, FIELD FREEZE
AUTO FREEZE
TIMER(19A, 17B)
LED DRIVER
(13B)
BPLED
AUTO, FRAME FREEZE, FIELD FREEZE, BYPASS
6
5
4
3
2
1
A
B
C
E
F
G
H
7/8


6
5
4
3
2
1
REFIN
BUFFER AMP
SUBCARRIER COMPARATOR (15N)
PHASE COMPARATOR (13M)
SUBCARRIER SHIFTER (12B, 11B)
SAMPLE & HOLD (8M)
BUFFER AMP (7M)
VCXO 17.734MHZ (X1)
SYNC GENERATER (2B)
SC
BURST MODULATOR (19L)
BURST
SYNC PULSE
H SYNC COMPARATOR (15N)
H PHASE SHIFTER (7D, 8B)
PHASE COMPARATOR (6B)
VCXO 14.188MHZ (X2)
CLK
HD
HRETT
VIDEO PHASE SHIFTER (8B)
PHASE COMPARATOR (2D)
VCXO 13.5MHZ (X4)
READ CLOCK
ADVANCE SYNC GENERATER (9C)
ADVSYNC
A
B
C
4-13
4-13
E
F
G
H

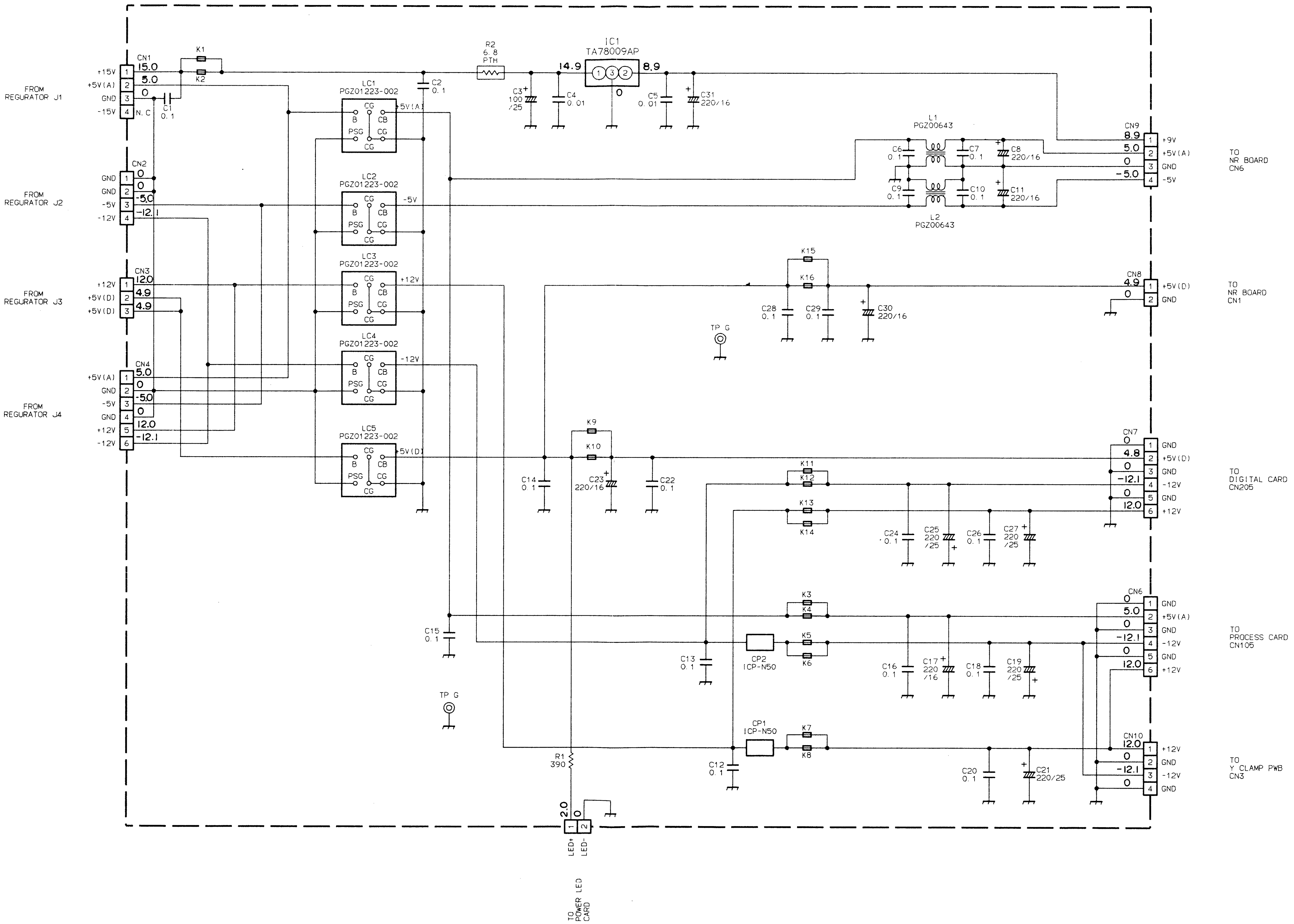
4.6 NOISE REDUCER BLOCK DIAGRAM


C DATA IN (CN1)
IC1 LATCH
IC9 INV.
IC14 LATCH
IC2.3 ADD
IC4 LINE MEM.
IC5 LATCH
IC22 LATCH
C DATA OUT (CN3)
IC10 LATCH
IC11,12 FIELD MEM.
IC15 INV. LATCH
SW1 CNR LEVEL SW
IC13 GATE
IC8 TABLE
SW2 NR SW
IC21 LATCH
IC16 DRIVER
IC6.7 ADD
NR LED (CN7)
IC17 BUFFER
RD13.5 (CN2)
IC16 INV.
IC18,19,20 TIMING GEN.
RD VD (CN2)
IC17 INV.
HRET1 (CN2)
IC109 BUFFER
Y DATA IN (CN1)
IC101 LATCH
IC103 LINE MEM.
IC107 LINE MEM.
IC102 DAC
IC106 DAC
IC108 DAC
D101,104 LEVEL SHIFT
D102,105 LEVEL SHIFT
D103,106 LEVEL SHIFT
Q101 BUFFER
Q102 BUFFER
Q103 BUFFER
TP201
TP202
TP203
Q201 BUFFER
Q205 BUFFER
Q209 BUFFER
SW3 YNR SW
IC311 GATE
pos.1
pos.2
Q331 BUFFER
DL302 200nS DL
IC302 AMP
Q306,307 BUFFER
Q308,309 DRIVER
Y OUT (CN8)
IC308 ALU
Q325,C351 R373,375 PHASE SHIFT
Q326 BUFFER
IC309 AMP
SW5
LIM-1
D306,307 C355
Q327,329 BUFFER
TP313
IC310
Q330 BUFFER
R390 ATT
R201 ATT
Q202 BUFFER
LPF201 5.2MHz LPF
Q203 AMP
Q204 BUFFER
D201,C228 LEVEL SHIFT
TP301
Q302,C302 R303,305 PHASE SHIFT
Q303 BUFFER
DL301 120nS DL
IC301 AMP
Q304,305 BUFFER
TP302
R217 ATT
Q206 BUFFER
LPF202 5.2MHz LPF
Q207 AMP
Q208 BUFFER
D202,C229 LEVEL SHIFT
TP306
Q311,C319,R326,328 PHASE SHIFT
Q312 BUFFER
DL303 120nS DL
IC303 AMP
Q313,314 BUFFER
TP307
R233 ATT
Q210 BUFFER
LPF203 5.2MHz LPF
Q211 AMP
Q212 BUFFER
D203,C230 LEVEL SHIFT
TP311
Q321,C340,R360,362 PHASE SHIFT
Q322 BUFFER
DL304 120nS DL
IC307 AMP
Q323,324 BUFFER
TP312
1/4 R356
1/2 R358
1/4 R357
IC304 AMP
Q315 BUFFER
LPF301 1.3MHzLPF
Q316 BUF.
IC305 AMP R353
SW5
LIM-2
D303,304 C332,333
Q317,318 BUFFER
TP308
IC306
Q319 BUFFER
R391 ATT
6
5
4
3
2
1
A
B
C
E
F
G
H

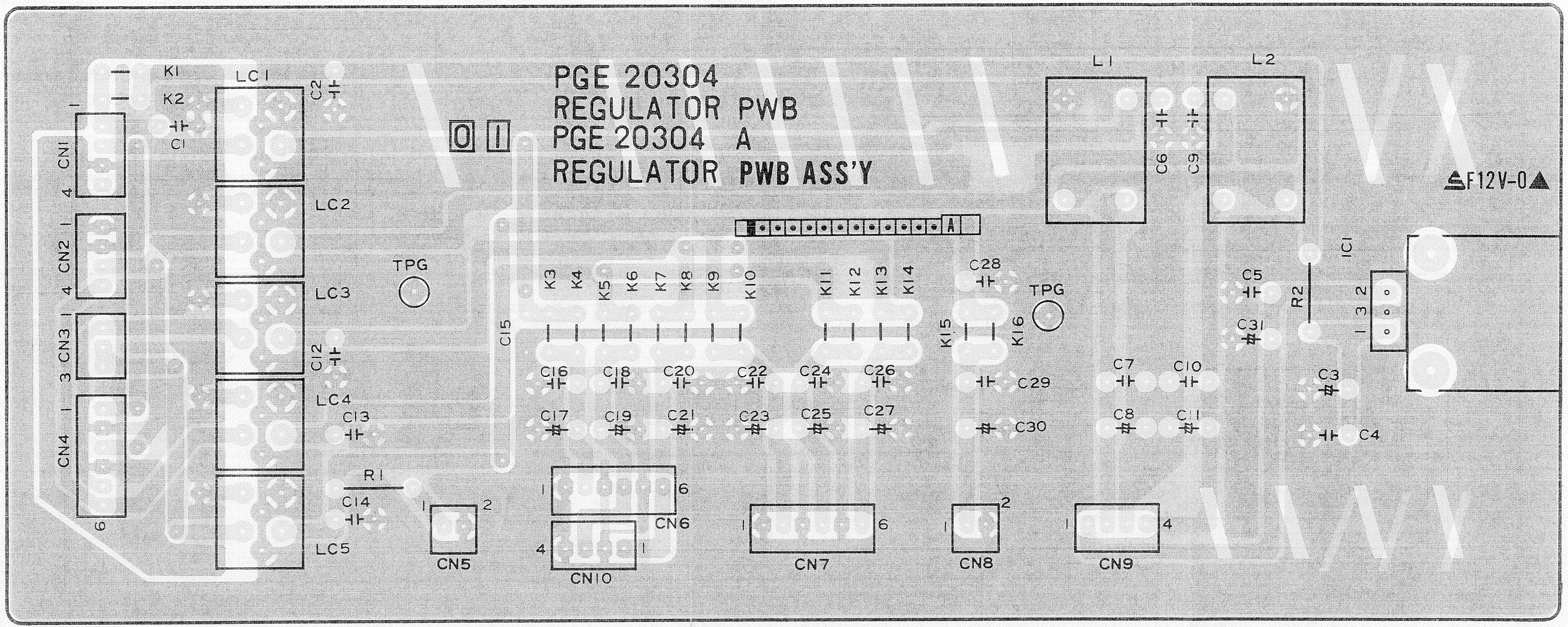
4.7 POWER SUPPLY SCHEMATIC DIAGRAM


CN 1
1
2
3
4
5
LINE FILTER
F
AC IN
220/240V 50/60Hz
100/120V
240V
100V
VOL. SEL.
F 1
L 11
2541-1
C 1
C 2
L 1
C 3
C 4
CX
L 2
C 5
C 6
PST 1
PST 2
RC 1
R 1
C 7
S
100V
200V
R 2
C 8
R 5
R 6
C 9
R 3
D 1
LT 1
Q 1
R 4
D 2
C 10
C 41
C 42
R 7
D 3
R 8
D 4
R 9
R 10
T 2
HIC
CM-008
D 6
R 12
C 12
RV 4
R 13
C 13
D 8
R 14
R 15
D 9
R 17
C 14
R 18
RV 1
R 16
D 7
T 1
D 17-1
DL 9
D 17-2
D 16-1
DL 8
D 16-2
DL 10
DL 7
SRZ
D 14-1
D 14-2
DL 6
R 34
C 27
D 15
L 8
L 9
L 7
R 43
R 44
C 31
C 32
R 36
Q 3
R 35
R 38
C 29
R 39
R 37
IC 3
C 28
RV 3
R 40
R 41
C 43
R 42
C 30
SR 1
D 12-1
D 12-2
DL 5
D 13
R 25
C 23
L 6
R 26
R 27
Q 2
R 29
C 25
R 30
R 28
IC 2
C 24
RV 2
R 31
R 32
R 33
C 40
C 26
D 11-1
DL 4
R 22
C 19
D 11-2
DL 3
R 23
C 20
L 5
IC 1
C 21
C 22
R 24
L 10
D 10-1
DL 2
R 19
C 15
D 10-2
DL 1
R 20
C 16
C 39
L 4
R 21
C 17
C 18
C 33
C 34
C 35
C 36
C 37
JC 4
R 45
C 38
J 1
+15V
+5V(A)
GND
-15V
TO 0 1 REGULATOR CN 1
J 2
GND
GND
-5V
-12V
TO 0 1 REGULATOR CN 2
J 3
+12V
+5V
+5V
TO 0 1 REGULATOR CN 3
J 4
+5V
GND
-5V
GND
+12V
-12V
TO 0 1 REGULATOR CN 4
J 5
+12V
NC
GND
TO FAN 1
J 6
+12V
NC
GND
TO FAN 2
0 2 SWITCHING REGULATOR
A
B
C
E
F
G
H
1
2
3
4
5
6

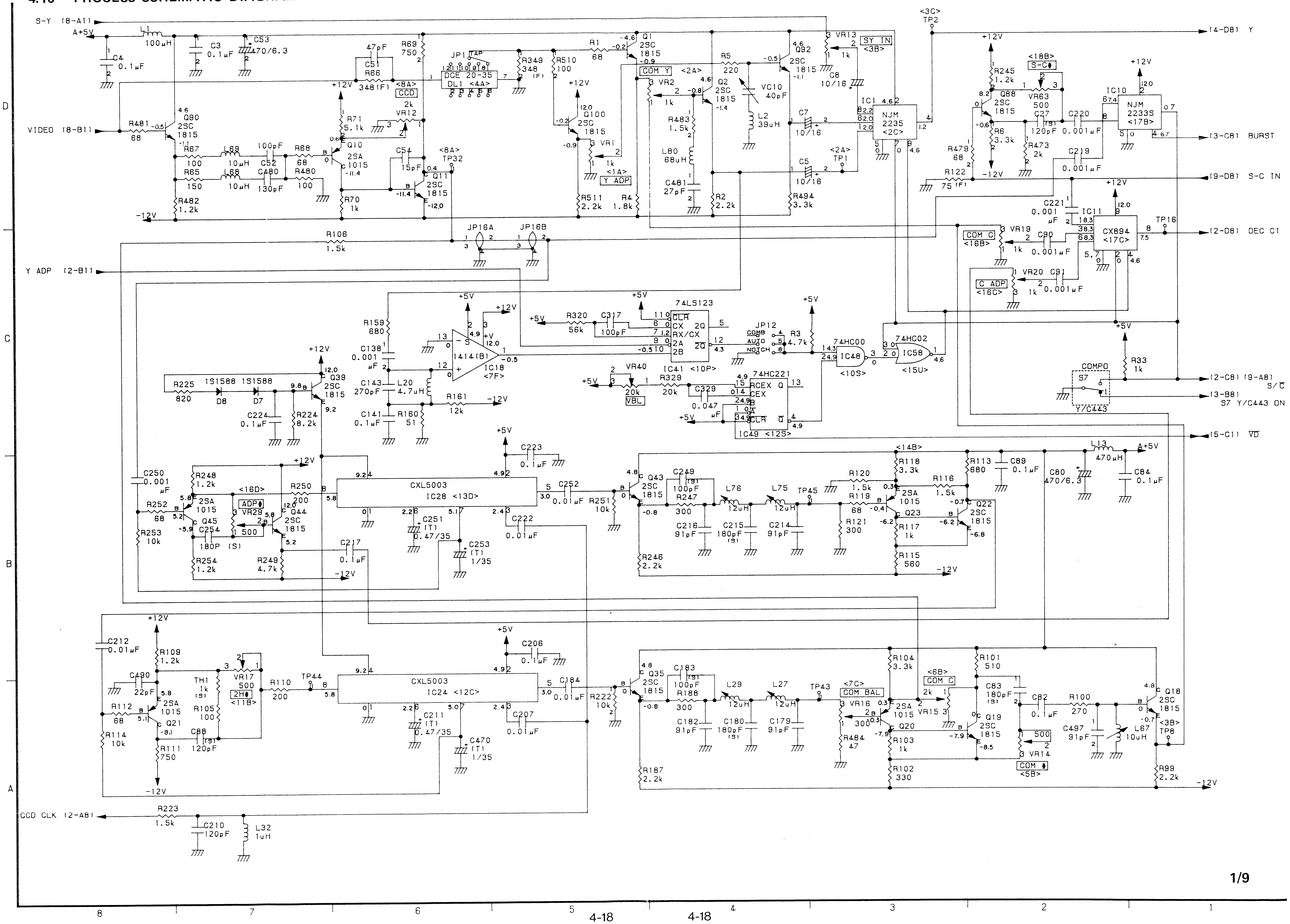
4.8 REGULATOR SCHEMATIC DIAGRAM

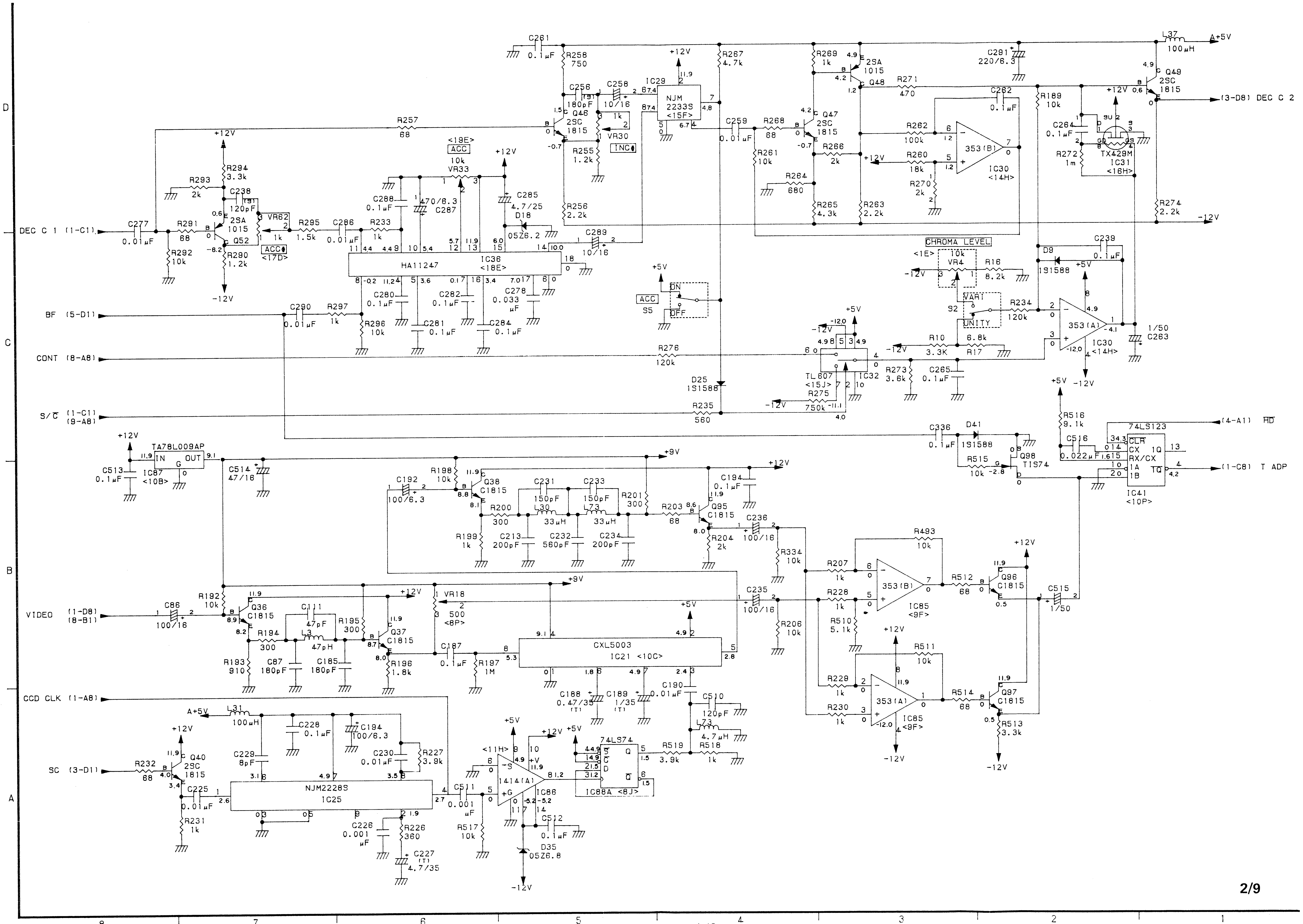

FROM REGURATOR J1
+15V
+5V(A)
GND
-15V
CN1
15.0
5.0
0
N.C
C1 0.1
K1
K2
FROM REGURATOR J2
CN2
GND
GND
-5V
-12V
-5.0
-12.1
FROM REGURATOR J3
CN3
+12V
+5V(D)
+5V(D)
12.0
4.9
4.9
FROM REGURATOR J4
CN4
+5V(A)
GND
-5V
GND
+12V
-12V
5.0
-5.0
12.0
-12.1
LC1 PGZ01223-002
LC2 PGZ01223-002
LC3 PGZ01223-002
LC4 PGZ01223-002
LC5 PGZ01223-002
CG
B
CB
PSG
+5V(A)
-5V
+12V
-12V
+5V(D)
C2 0.1
R2 6.8 PTH
IC1 TA78009AP
14.9
8.9
C3 100/25
C4 0.01
C5 0.01
C31 220/16
L1 PGZ00643
L2 PGZ00643
C6 0.1
C7 0.1
C8 220/16
C9 0.1
C10 0.1
C11 220/16
CN9
8.9
5.0
-5.0
+9V
+5V(A)
GND
-5V
TO NR BOARD CN6
K15
K16
C28 0.1
C29 0.1
C30 220/16
TP G
CN8
4.9
+5V(D)
GND
TO NR BOARD CN1
K9
K10
C14 0.1
C23 220/16
C22 0.1
K11
K12
K13
K14
C24 0.1
C25 220/25
C26 0.1
C27 220/25
CN7
4.8
-12.1
12.0
GND
+5V(D)
GND
-12V
GND
+12V
TO DIGITAL CARD CN205
C15 0.1
K3
K4
K5
K6
CP2 ICP-N50
C13 0.1
C16 0.1
C17 220/16
C18 0.1
C19 220/25
CN6
5.0
-12.1
12.0
GND
+5V(A)
GND
-12V
GND
+12V
TO PROCESS CARD CN105
TP G
CP1 ICP-N50
K7
K8
C12 0.1
C20 0.1
C21 220/25
R1 390
CN10
12.0
-12.1
+12V
GND
-12V
GND
TO Y CLAMP PWB CN3
2.0
LED+
LED-
TO POWER LED CARD
6
5
4
3
2
1
A
B
C
D
E
F
G
H

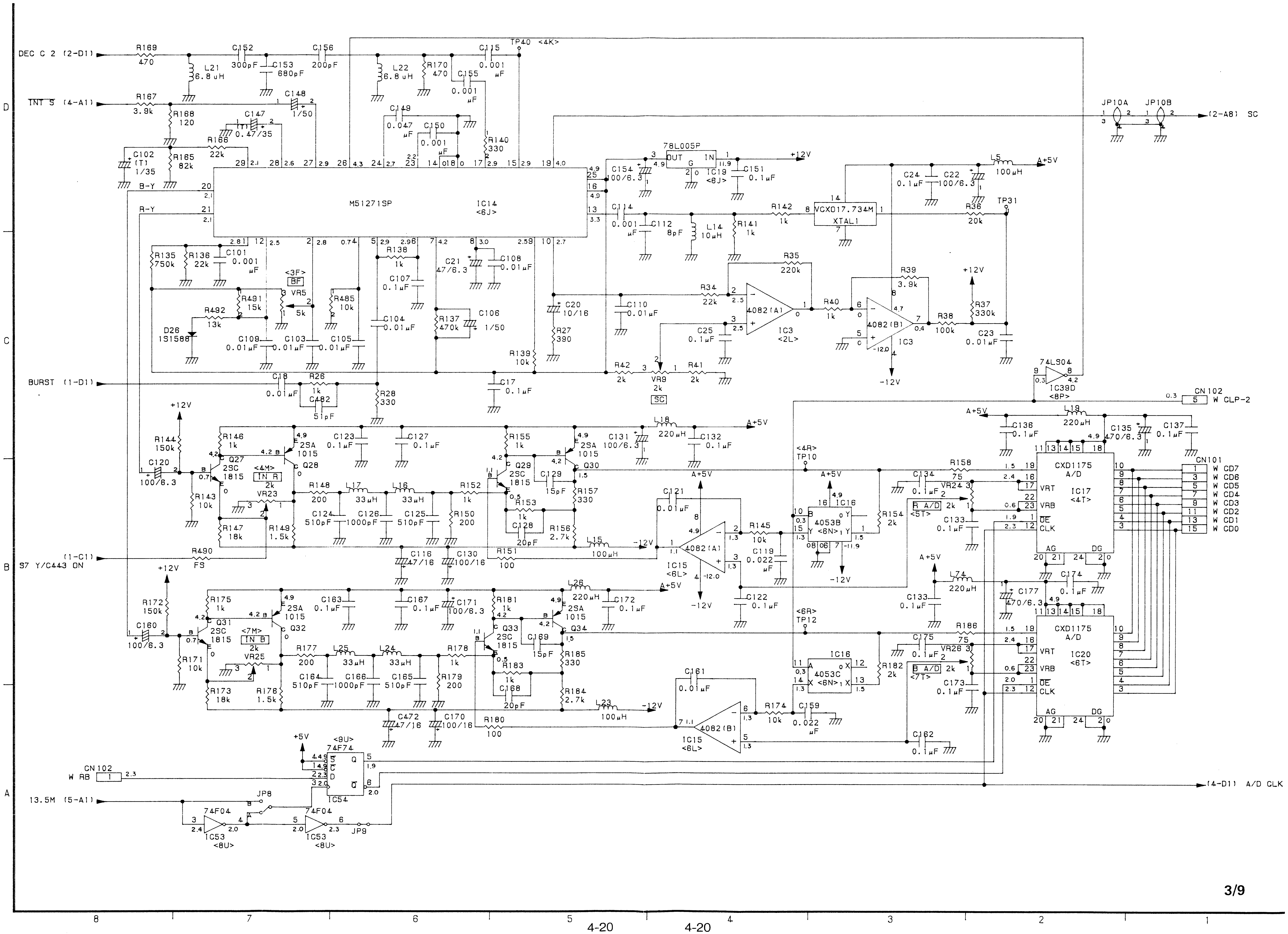
4.9 REGULATOR CIRCUIT BOARD


PGE 20304
REGULATOR PWB
PGE 20304 A
REGULATOR PWB ASS'Y
0 1
F12V-0
K1
K2
LC1
LC2
LC3
LC4
LC5
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
C29
C30
C31
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
TPG
TPG
R1
R2
IC1
L1
L2
K3
K4
K5
K6
K7
K8
K9
K10
K11
K12
K13
K14
K15
K16
A
1 3 2

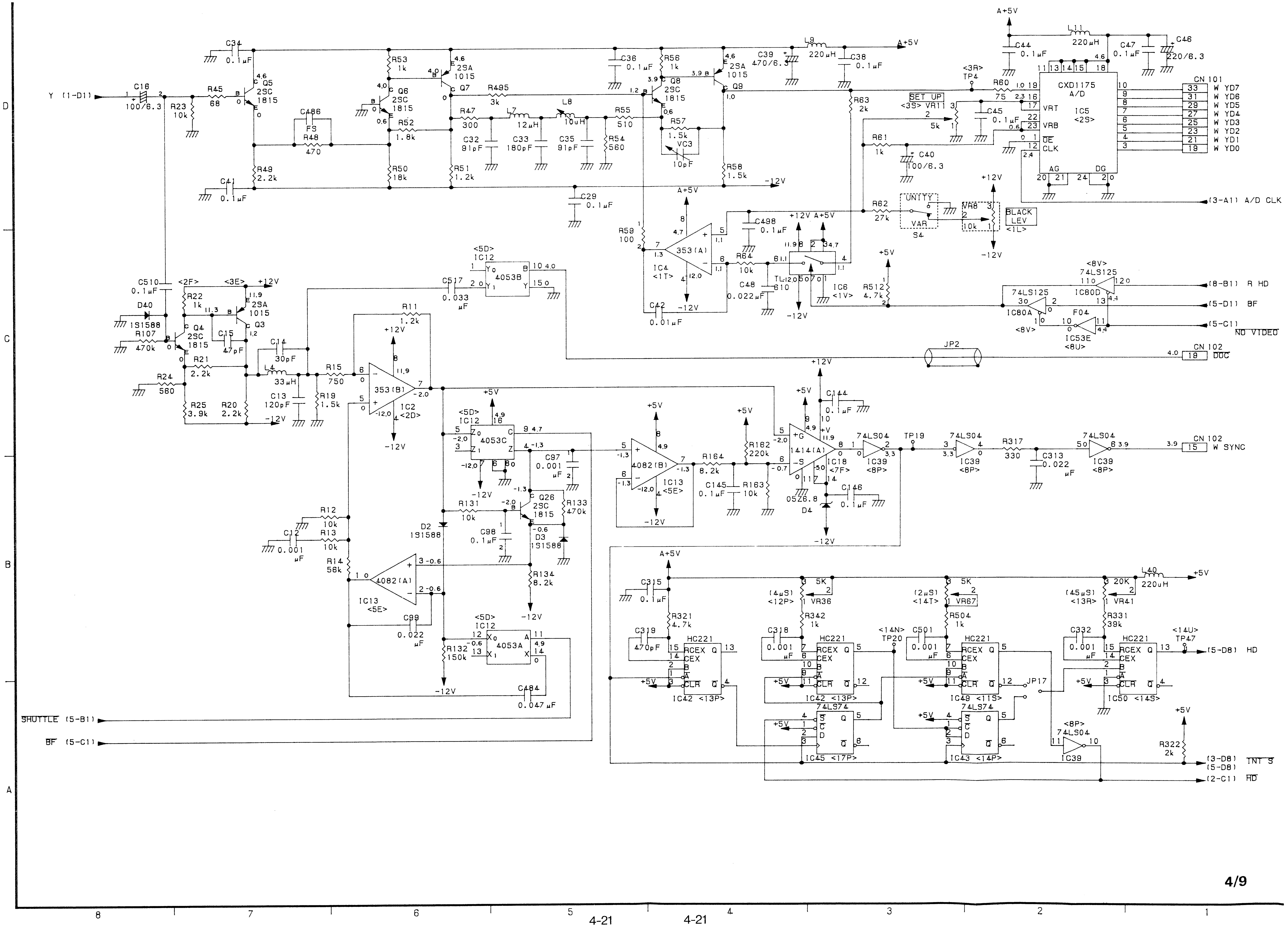
4.10 PROCESS SCHEMATIC DIAGRAM

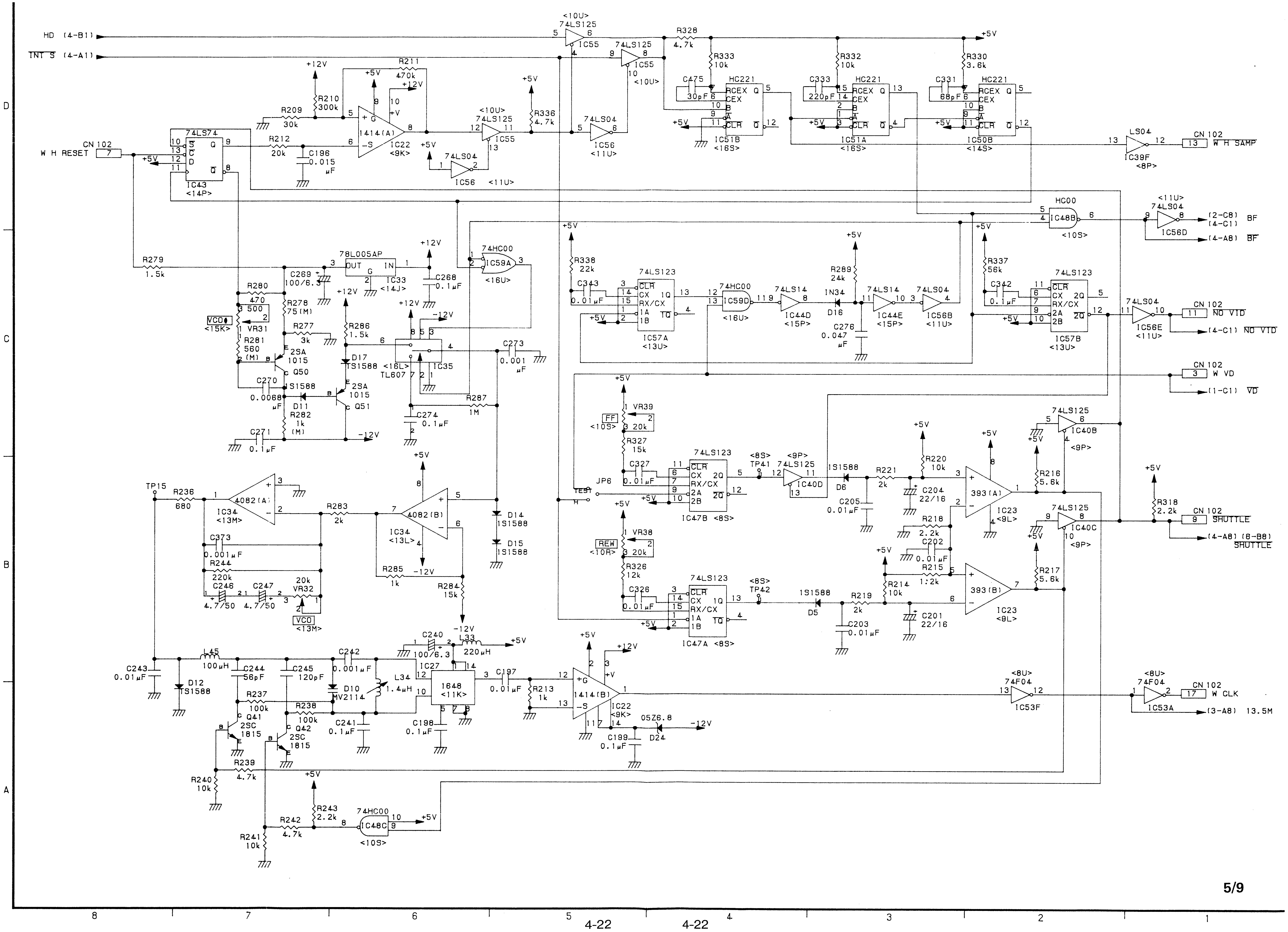

S-Y (8-A1)
A+5V
VIDEO (8-B1)
Y ADP (2-B1)
CCD CLK (2-A8)
(4-D8) Y
(3-C8) BURST
(9-D8) S-C IN
(2-D8) DEC C1
(2-C8) (9-A8) S/C
(3-B8) S7 Y/C443 ON
(5-C1) VD
<3C> TP2
L1 100μH
C4 0.1μF
C3 0.1μF
C53 470/6.3
C51 47pF
R66 348(F)
R69 750
JP1
DCE 20-35
DL1 <4A>
R349 348 (F)
R510 100
R1 68
Q1 2SC 1815
COM Y <2A>
R5 220
Q92 2SC 1815
VR13 1k
SY IN <3B>
C8 10/16
Q80 2SC 1815
R481 68
R67 100
L69 10μH
C52 100pF
R68 68
R65 150
L68 10μH
C480 130pF
R480 100
R482 1.2k
Q10 2SA 1015
R71 5.1k
VR12 2k
<8A> CCD
C54 15pF
Q11 2SC 1815
<8A> TP32
R70 1k
Q100 2SC 1815
VR1 1k
<1A> Y ADP
R511 2.2k
R4 1.8k
VR2 1k
Q2 2SC 1815
VC10 40pF
L2 39μH
R483 1.5k
L80 68μH
C481 27pF
R2 2.2k
C7 10/16
C5 10/16
<2A> TP1
R494 3.3k
IC1 NJM 2235 <2C>
R245 1.2k
Q88 2SC 1815
<18B> S-C
VR63 500
C27 120pF
C220 0.001μF
IC10 NJM 2233S <17B>
R6 3.3k
R479 68
R473 2k
C219 0.001μF
R122 75 (F)
C221 0.001μF
IC11 CX894 <17C>
TP16
COM C <16B>
VR19 1k
C90 0.001μF
C ADP <16C>
VR20 1k
C91 0.001μF
R106 1.5k
JP16A
JP16B
R159 680
C138 0.001μF
C143 270pF
L20 4.7μH
IC18 1414(B1) <7F>
R161 12k
C141 0.1μF
R160 51
R320 56k
C317 100pF
74LS123
IC41 <10P>
JP12 COMB AUTO NOTCH
R3 4.7k
74HC00 IC48 <10S>
74HC02 IC58 <15U>
VR40 20k VBL
R329 20k
C329 0.047μF
74HC221 IC49 <12S>
R33 1k
COMPO S7 Y/C443
R225 820
1S1588 1S1588
D8 D7
Q39 2SC 1815
C224 0.1μF
R224 8.2k
C250 0.001μF
R248 1.2k
R252 68
Q45 2SA 1015
C254 180P (S)
ADP VR29 500
Q44 2SC 1815
R250 200
R253 10k
R254 1.2k
R249 4.7k
C217 0.1μF
CXL5003 IC28 <13D>
C223 0.1μF
C251 (T) 0.47/35
C253 (T) 1/35
C222 0.01μF
C252 0.01μF
R251 10k
Q43 2SC 1815
C249 100pF
R247 300
L76 12uH
L75 12uH
TP45
C216 91pF
C215 180pF
C214 91pF
R246 2.2k
<14B>
R118 3.3k
R120 1.5k
R119 68
R121 300
Q23 2SA 1015
R116 1.5k
R117 1k
R115 560
Q22 2SC 1815
R113 680
C89 0.1μF
C80 470/6.3
L13 470μH
C84 0.1μF
C212 0.01μF
R109 1.2k
C490 22pF
TH1 1k
VR17 500 2H <11B>
R110 200
TP44
Q21 2SA 1015
R112 68
R114 10k
R105 100
C88 120pF
R111 750
CXL5003 IC24 <12C>
C206 0.1μF
C211 (T) 0.47/35
C470 (T) 1/35
C207 0.01μF
C184 0.01μF
R222 10k
Q35 2SC 1815
C183 100pF
R188 300
L29 12uH
L27 12uH
TP43
C182 91pF
C180 180pF
C179 91pF
R187 2.2k
<7C> COM BAL
VR16 300
R484 47
R104 3.3k
Q20 2SA 1015
<6B> COM C
VR15 2k
R103 1k
R102 330
R101 510
C83 180pF
Q19 2SC 1815
VR14 500
COM <5B>
C82 0.1μF
R100 270
C497 91pF
L67 10uH
Q18 2SC 1815
<3B> TP8
R99 2.2k
R223 1.5k
C210 120pF
L32 1uH
+12V
-12V
+5V
D
C
B
A
8
7
6
5
4
3
2
1
1/9

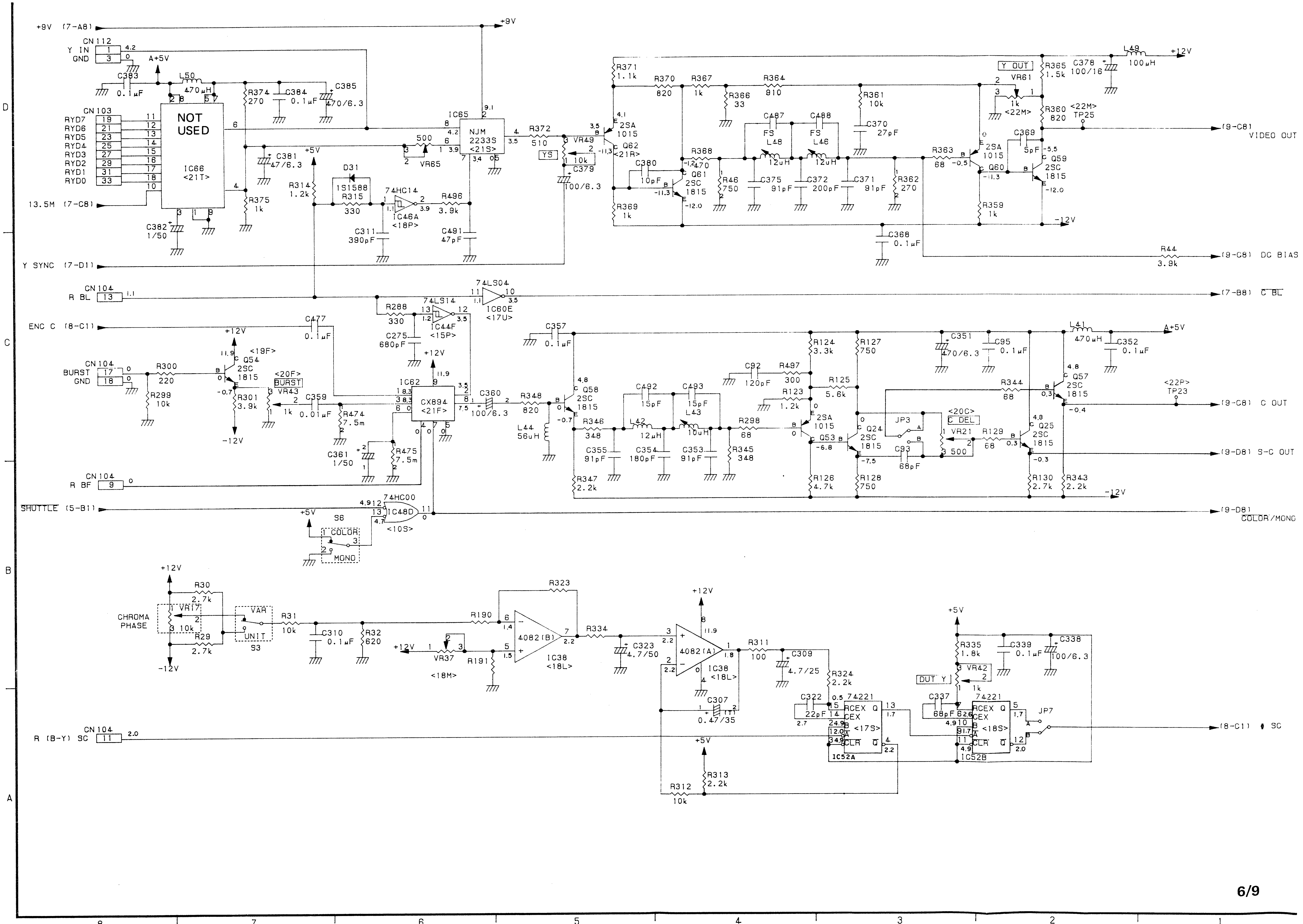

DEC C 1 (1-C1)
BF (5-D1)
CONT (8-A8)
S/C̄ (1-C1) (9-A8)
VIDEO (1-D8) (8-B1)
CCD CLK (1-A8)
SC (3-D1)
(3-D8) DEC C 2
(4-A1) HD
(1-C8) T ADP
A+5V
+12V
-12V
+9V
+5V
HA11247
IC36 <18E>
NJM 2233S
IC29 <15F>
353(B)
IC30 <14H>
353(A)
TX429M
IC31 <16H>
TL607
IC32 <15J>
74LS123
IC41 <10P>
TA78L009AP
IC87 <10B>
CXL5003
IC21 <10C>
IC85 <9F>
NJM2228S
IC25
1414(A)
IC86
74LS74
IC88A <8J>
CHROMA LEVEL
VR4
ACC
VR33
VR30
INC
VR62
VR18
S5 ON OFF
S2 VARI UNITY
Q46 2SC 1815
Q47 2SC 1815
Q48 2SA 1015
Q49 2SC 1815
Q52 2SA 1015
Q36 C1815
Q37 C1815
Q38 C1815
Q95 C1815
Q96 C1815
Q97 C1815
Q98 TIS74
Q40 2SC 1815
D18 05Z6.2
D25 1S1588
D9 1S1588
D41 1S1588
D35 05Z6.8
L37 100μH
L30 33μH
L73 33μH
L3 47pH
L31 100μH
L73 4.7μH
8
7
6
5
4
3
2
1
D
C
B
A



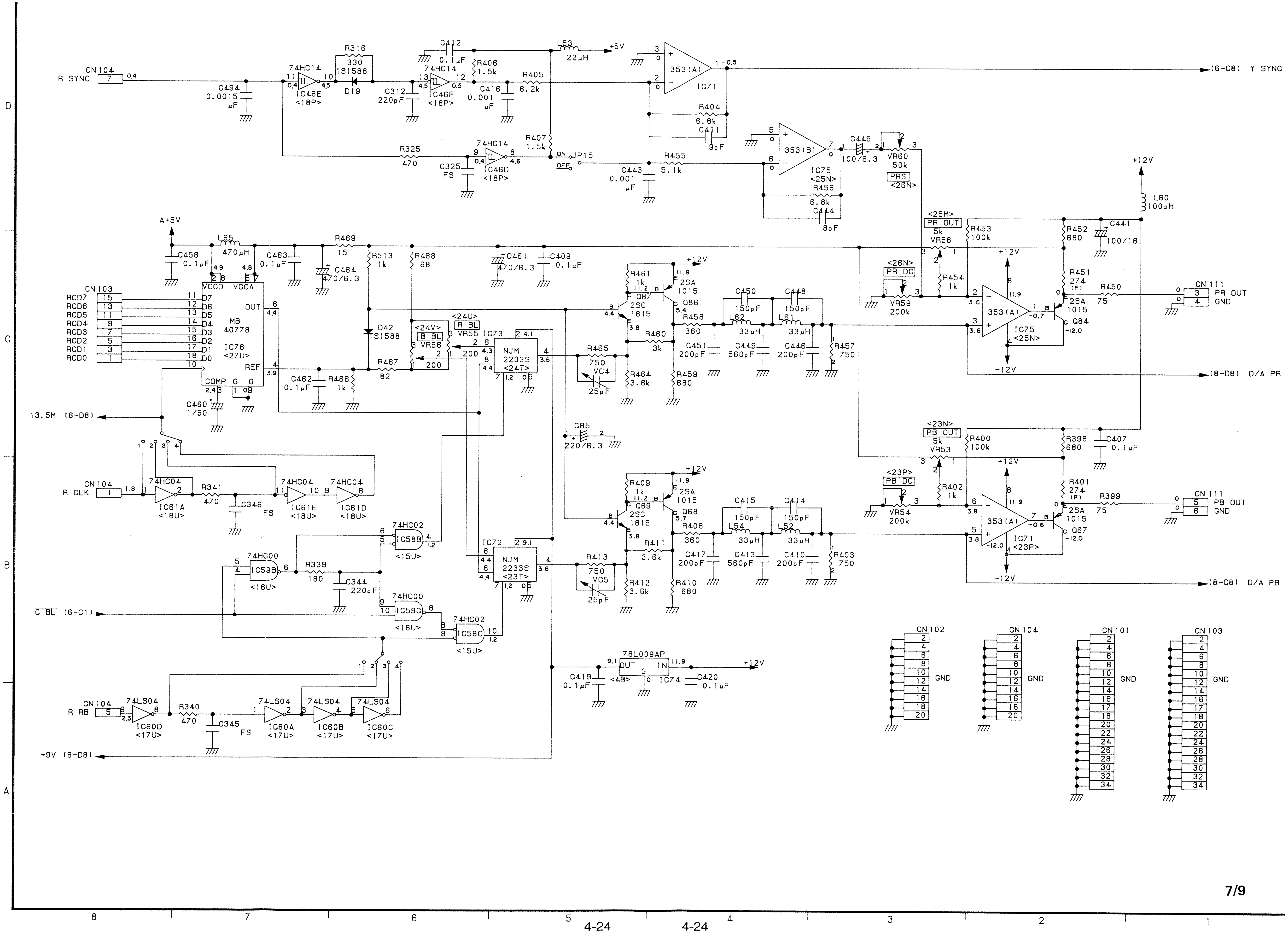
DEC C 2 (2-D1)
INT S (4-A1)
BURST (1-D1)
(1-C1) S7 Y/C443 ON
CN102 W RB
13.5M (5-A1)
M51271SP IC14 <6J>
78L005P IC19 <8J>
VCXO17.734M XTAL1
4082(A) IC3 <2L>
4082(B) IC3
74LS04 IC39D <8P>
JP10A
JP10B
(2-A8) SC
TP40 <4K>
TP31
CN102 W CLP-2
CXD1175 A/D IC17 <4T>
CXD1175 A/D IC20 <6T>
CN101
W CD7
W CD6
W CD5
W CD4
W CD3
W CD2
W CD1
W CD0
4053B IC16 <6N>
4053C IC16 <6N>
4082(A) IC15 <6L>
4082(B) IC15 <6L>
74F74 IC54 <9U>
74F04 IC53 <8U>
JP8
JP9
(4-D1) A/D CLK
Q27 2SC1815
Q28 2SA1015
Q29 2SC1815
Q30 2SA1015
Q31 2SC1815
Q32 2SA1015
Q33 2SC1815
Q34 2SA1015
<4M> IN R
<7M> IN B
<3F> BF
VR5 5k
VR9 2k SC
VR23 2k
VR25 2k
VR24 2k R A/D <5T>
VR26 2k B A/D <7T>
<4R> TP10
<6R> TP12
D26 1S1588
+12V
-12V
A+5V
+5V
B-Y
R-Y
D
C
B
A
8
7
6
5
4
3
2
1
3/9


Y (1-D11)
C16 100/6.3
R23 10k
R45 68
C34 0.1µF
Q5 2SC 1815
C486 FS
R48 470
R49 2.2k
C41 0.1µF
R53 1k
Q6 2SC 1815
R52 1.8k
R50 18k
Q7 2SA 1015
R495 3k
R47 300
L7 12µH
L8 10uH
R55 510
C32 91pF
C33 180pF
C35 91pF
R54 560
R51 1.2k
C29 0.1µF
C36 0.1µF
R56 1k
Q8 2SC 1815
R57 1.5k
VC3 10pF
R58 1.5k
Q9 2SA 1015
C39 470/6.3
L9 220µH
C38 0.1µF
A+5V
-12V
R63 2k
R59 100
IC4 353(A) <1T>
C498 0.1µF
R64 10k
C48 0.022µF
TL1205
IC6 <1V>
C42 0.01µF
R62 27k
UNITY VAR S4
VR8 10k
BLACK LEV <1L>
R61 1k
C40 100/6.3
<3R> TP4
R60 75
SET UP <3S> VR11 5k
C45 0.1µF
C44 0.1µF
L11 220µH
C47 0.1µF
C46 220/6.3
CXD1175 A/D IC5 <2S>
VRT VRB OE CLK AG DG
CN101
W YD7
W YD6
W YD5
W YD4
W YD3
W YD2
W YD1
W YD0
(3-A1) A/D CLK
R512 4.7k
<8V> 74LS125 IC80D
74LS125 IC80A <8V>
F04 IC53E <8U>
(8-B1) R HD
(5-D11) BF
(5-C1) NO VIDEO
JP2
CN102 DOC
C510 0.1µF
D40 1S1588
R107 470k
R22 1k
Q4 2SC 1815
Q3 2SA 1015
C15 47pF
R21 2.2k
R24 560
R25 3.9k
R20 2.2k
C14 30pF
L4 33µH
C13 120pF
R19 1.5k
R15 750
R11 1.2k
IC2 353(B) <2D>
<5D> IC12 4053B
C517 0.033µF
<5D> IC12 4053C
C97 0.001µF
Q26 2SC 1815
R131 10k
C98 0.1µF
D3 1S1588
R133 470k
D2 1S1588
R134 8.2k
R12 10k
C12 0.001µF
R13 10k
R14 56k
IC13 4082(A) <5E>
C99 0.022µF
R132 150k
<5D> IC12 4053A
C484 0.047µF
SHUTTLE (5-B1)
BF (5-C1)
IC13 4082(B) <5E>
R164 8.2k
C145 0.1µF
R162 220k
R163 10k
IC18 1414(A) <7F>
C144 0.1µF
C146 0.1µF
D4 05Z6.8
74LS04 IC39 <8P>
TP19
R317 330
C313 0.022µF
CN102 W SYNC
C315 0.1µF
R321 4.7k
C319 470pF
HC221 IC42 <13P>
(4µS) <12P> VR36 5K
R342 1k
C318 0.001µF
(2µS) <14T> VR67 5K
R504 1k
<14N> TP20
C501 0.001µF
HC221 IC49 <11S>
JP17
(45µS) <13R> VR41 20K
R331 39k
C332 0.001µF
HC221 IC50 <14S>
L40 220uH
<14U> TP47
(5-D8) HD
74LS74 IC45 <17P>
74LS74 IC43 <14P>
<8P> 74LS04 IC39
R322 2k
(3-D8) (5-D8) INT S
(2-C1) HD
D C B A
8 7 6 5 4 3 2 1

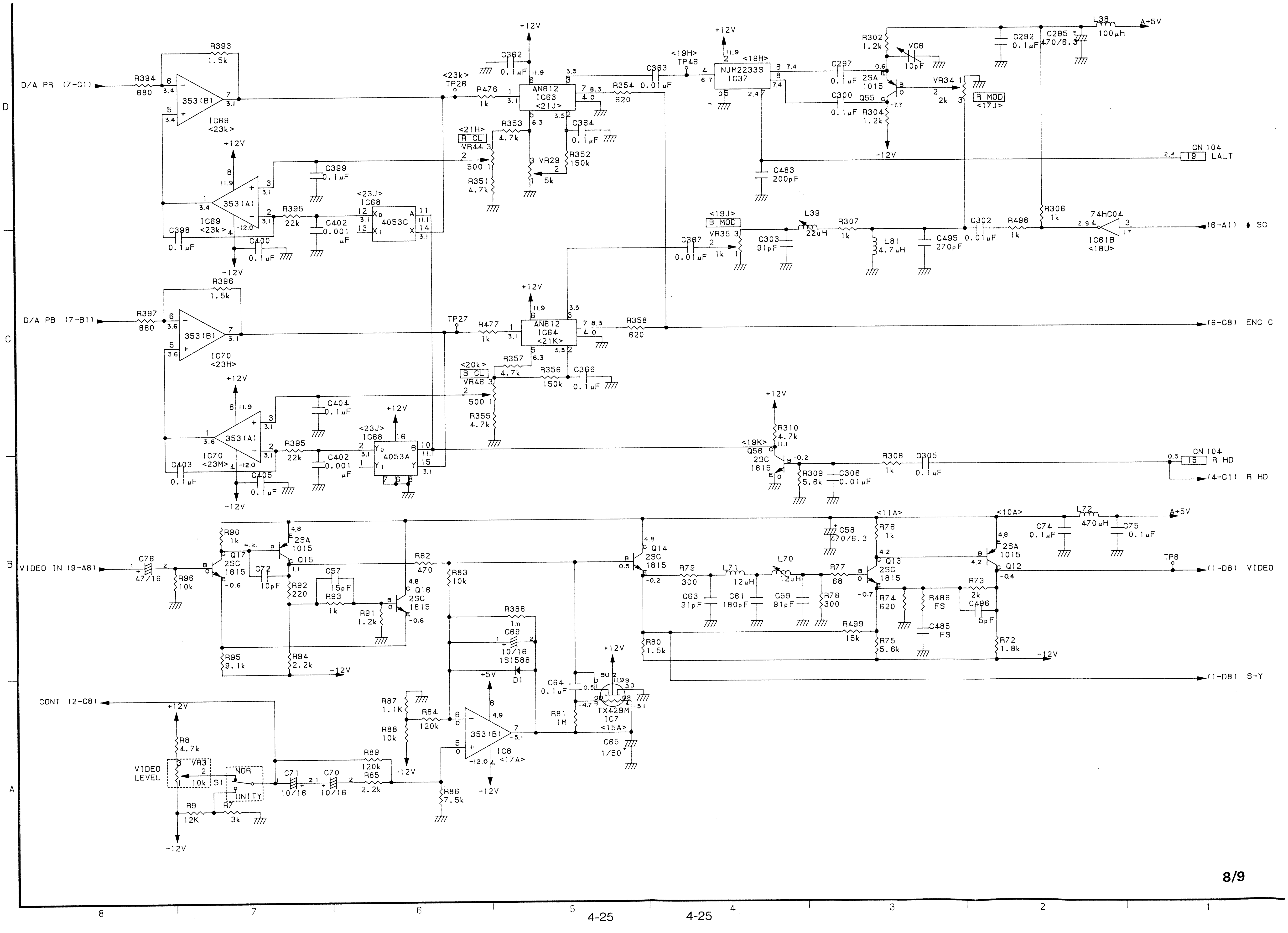

HD (4-B1)
INT S (4-A1)
W H RESET
CN 102
74LS74
IC43 <14P>
R209 30k
R210 300k
R211 470k
R212 20k
C196 0.015 μF
1414(A)
IC22 <9K>
74LS125
IC55 <10U>
R336 4.7k
74LS04
IC56 <11U>
R328 4.7k
R333 10k
R332 10k
R330 3.6k
C475 30pF
C333 220pF
C331 68pF
HC221
IC51B <16S>
IC51A <16S>
IC50B <14S>
LS04
IC39F <8P>
CN 102 13 W H SAMP
HC00
IC48B <10S>
74LS04
IC56D
(2-C8) (4-C1) BF
(4-A8) BF
R279 1.5k
78L005AP
IC33 <14J>
C269 100/6.3
C268 0.1μF
74HC00
IC59A <16U>
R280 470
VR31 500
VCO <15K>
R281 560 (M)
R278 75(M)
R277 3k
2SA1015 Q50
R286 1.5k
D17 1S1588
2SA1015 Q51
C270 0.0068 μF
D11 1S1588
R282 1k (M)
C271 0.1μF
TL607
IC35 <16L>
C273 0.001 μF
R287 1M
C274 0.1μF
R338 22k
C343 0.01μF
74LS123
IC57A <13U>
74HC00
IC59D <16U>
74LS14
IC44D <15P>
1N34 D16
R289 24k
C276 0.047 μF
IC44E <15P>
IC56B <11U>
R337 56k
C342 0.1μF
IC57B <13U>
IC56E <11U>
CN 102 11 NO VID
(4-C1) NO VID
CN 102 3 W VD
(1-C1) VD
TP15
R236 680
4082(A)
IC34 <13M>
C373 0.001μF
R244 220k
C246 4.7/50
C247 4.7/50
VR32 20k
VCO <13M>
R283 2k
4082(B)
IC34 <13L>
R285 1k
R284 15k
D14 1S1588
D15 1S1588
FF <10S>
VR39 20k
R327 15k
C327 0.01μF
IC47B <8S>
TP41 <8S>
IC40D <9P>
1S1588 D6
R221 2k
C205 0.01μF
R220 10k
C204 22/16
393(A)
IC23 <9L>
R218 2.2k
C202 0.01μF
R216 5.6k
IC40B <9P>
IC40C <9P>
R318 2.2k
CN 102 9 SHUTTLE
(4-A8) (8-B8) SHUTTLE
TEST JP6 H
REW <10R>
VR38 20k
R326 12k
C326 0.01μF
IC47A <8S>
TP42 <8S>
1S1588 D5
R219 2k
C203 0.01μF
R214 10k
R215 1.2k
C201 22/16
393(B)
R217 5.6k
C243 0.01μF
D12 1S1588
L45 100μH
C244 56pF
C245 120pF
C242 0.001μF
D10 MV2114
L34 1.4μH
C240 100/6.3
L33 220μH
1648
IC27 <11K>
C198 0.1μF
C197 0.01μF
R213 1k
1414(B)
IC22 <9K>
C199 0.1μF
05Z6.8 D24
R237 100k
R238 100k
C241 0.1μF
2SC1815 Q41
2SC1815 Q42
R239 4.7k
R240 10k
R243 2.2k
R242 4.7k
R241 10k
74HC00
IC48C <10S>
74F04
IC53F <8U>
IC53A <8U>
CN 102 17 W CLK
(3-A8) 13.5M
+5V
+12V
-12V
D
C
B
A
8
7
6
5
4
3
2
1

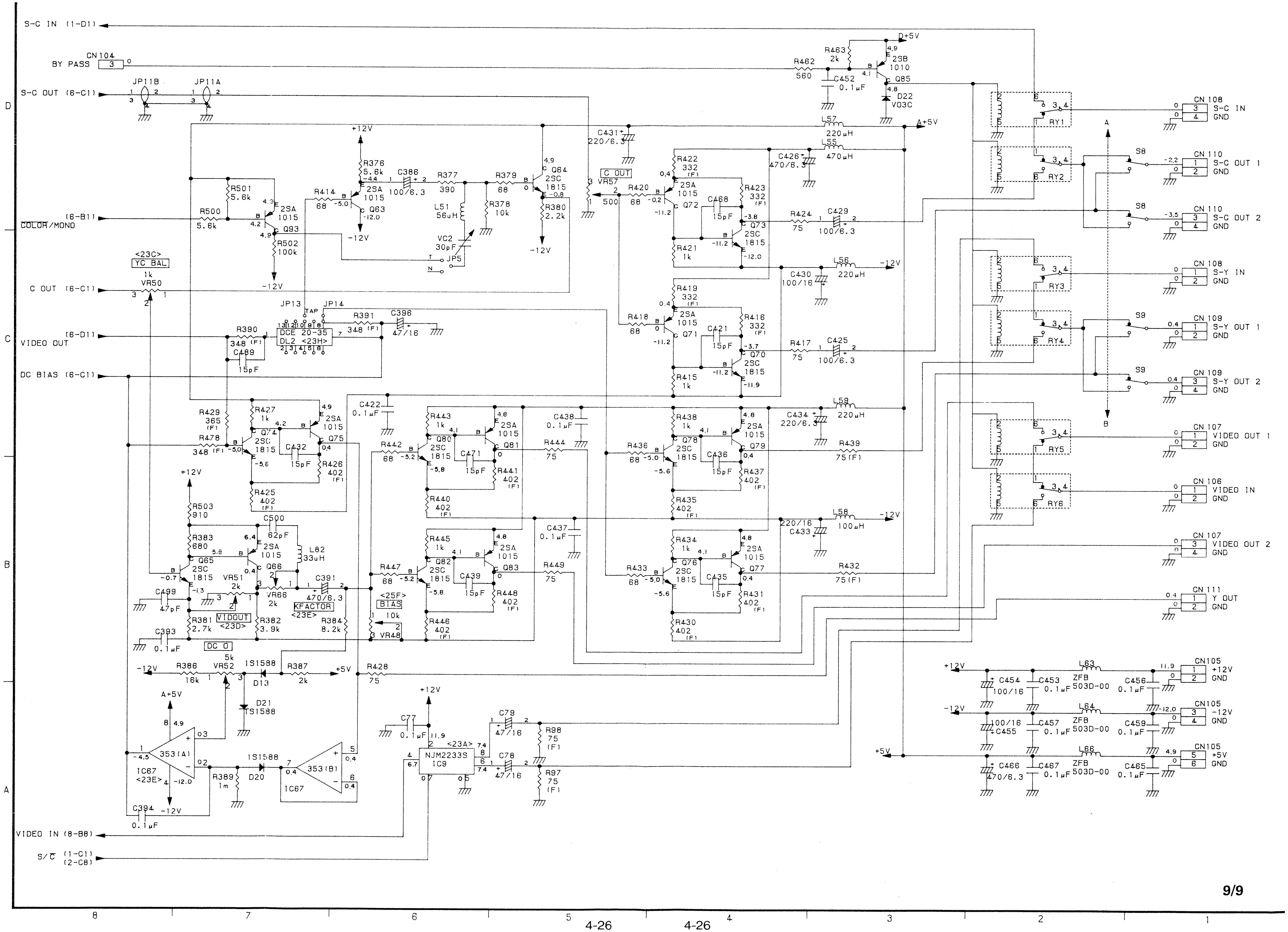

+9V (7-A8)
CN112
Y IN
GND
A+5V
C383 0.1μF
L50 470μH
R374 270
C384 0.1μF
C385 470/6.3
CN103
RYD7
RYD6
RYD5
RYD4
RYD3
RYD2
RYD1
RYD0
NOT USED
IC66 <21T>
13.5M (7-C8)
C382 1/50
R375 1k
C381 47/6.3
+5V
R314 1.2k
D31 1S1588
R315 330
74HC14
IC46A <18P>
C311 390pF
R496 3.9k
C491 47pF
IC65
NJM 2233S <21S>
500
VR65
R372 510
VR49 10k
YS
C379 100/6.3
Y SYNC (7-D11)
R371 1.1k
2SA 1015 Q62 <21R>
R370 820
R367 1k
R366 33
R364 910
R361 10k
C370 27pF
C487 FS L48
C488 FS L46
C380 10pF
Q61 2SC 1815
R368 470
R46 750
C375 91pF
C372 200pF
C371 91pF
R362 270
R369 1k
C368 0.1μF
R363 68
2SA 1015 Q60
R359 1k
Y OUT
VR61 1k <22M>
R365 1.5k
C378 100/16
L49 100μH
+12V
R360 820
<22M> TP25
C369 5pF
Q59 2SC 1815
-12V
(9-C8) VIDEO OUT
R44 3.9k
(9-C8) DC BIAS
CN104
R BL
74LS04
IC60E <17U>
(7-B8) C BL
R288 330
74LS14
IC44F <15P>
C275 680pF
ENC C (8-C1)
C477 0.1μF
+12V
Q54 2SC 1815 <19F>
<20F> BURST
VR43 1k
BURST
GND
R300 220
R299 10k
R301 3.9k
-12V
C359 0.01μF
R474 7.5m
IC62 CX894 <21F>
C361 1/50
R475 7.5m
C360 100/6.3
R348 820
L44 56uH
C357 0.1μF
Q58 2SC 1815
R346 348
L42 12μH
L43 10uH
C492 15pF
C493 15pF
C355 91pF
C354 180pF
C353 91pF
R345 348
R347 2.2k
C92 120pF
R497 300
R123 1.2k
R124 3.3k
R127 750
R125 5.6k
R298 68
2SA 1015 Q53
Q24 2SC 1815
JP3
C93 68pF
<20C> C DEL
VR21 500
R129 68
R126 4.7k
R128 750
C351 470/6.3
C95 0.1μF
L41 470μH
C352 0.1μF
A+5V
R344 68
Q57 2SC 1815
<22P> TP23
(9-C8) C OUT
Q25 2SC 1815
(9-D8) S-C OUT
R130 2.7k
R343 2.2k
CN104 R BF
SHUTTLE (5-B1)
74HC00
IC48D <10S>
S6
COLOR
MONO
(9-D8) COLOR/MONO
+12V
R30 2.7k
CHROMA PHASE
VR17 10k
R29 2.7k
-12V
VAR
UNIT
S3
R31 10k
C310 0.1μF
R32 620
R190
R323
4082(B)
IC38 <18L>
VR37
R191
<18M>
R334
C323 4.7/50
4082(A)
IC38 <18L>
C307 0.47/35
R311 100
C309 4.7/25
R324 2.2k
+5V
R313 2.2k
R312 10k
C322 22pF
74221 <17S>
IC52A
R335 1.8k
C339 0.1μF
C338 100/6.3
VR42 1k
OUT Y
C337 68pF
74221 <18S>
IC52B
JP7
(8-C1) ϕ SC
CN104 R (B-Y) SC
D
C
B
A
8
7
6
5
4
3
2
1

6/9

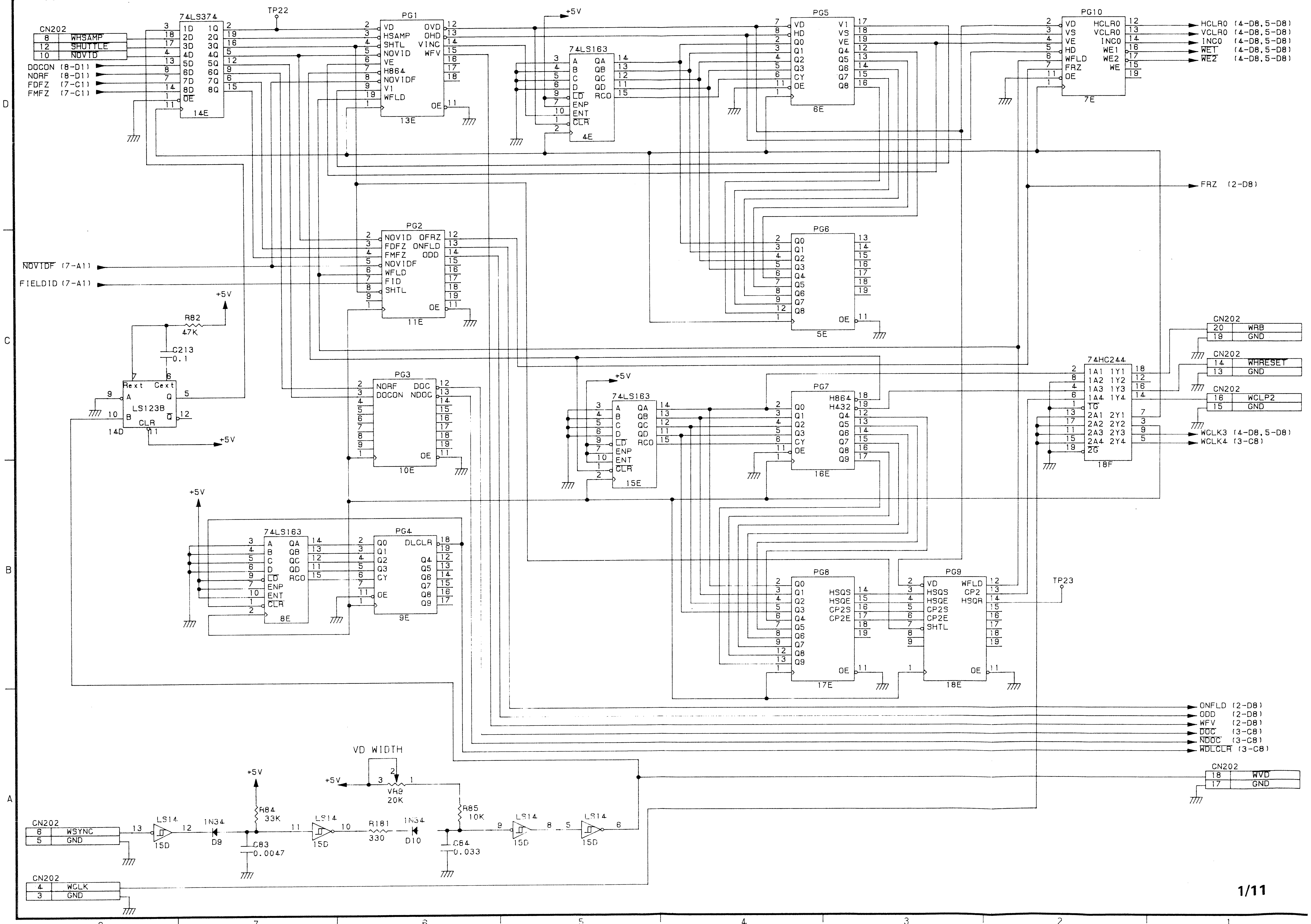


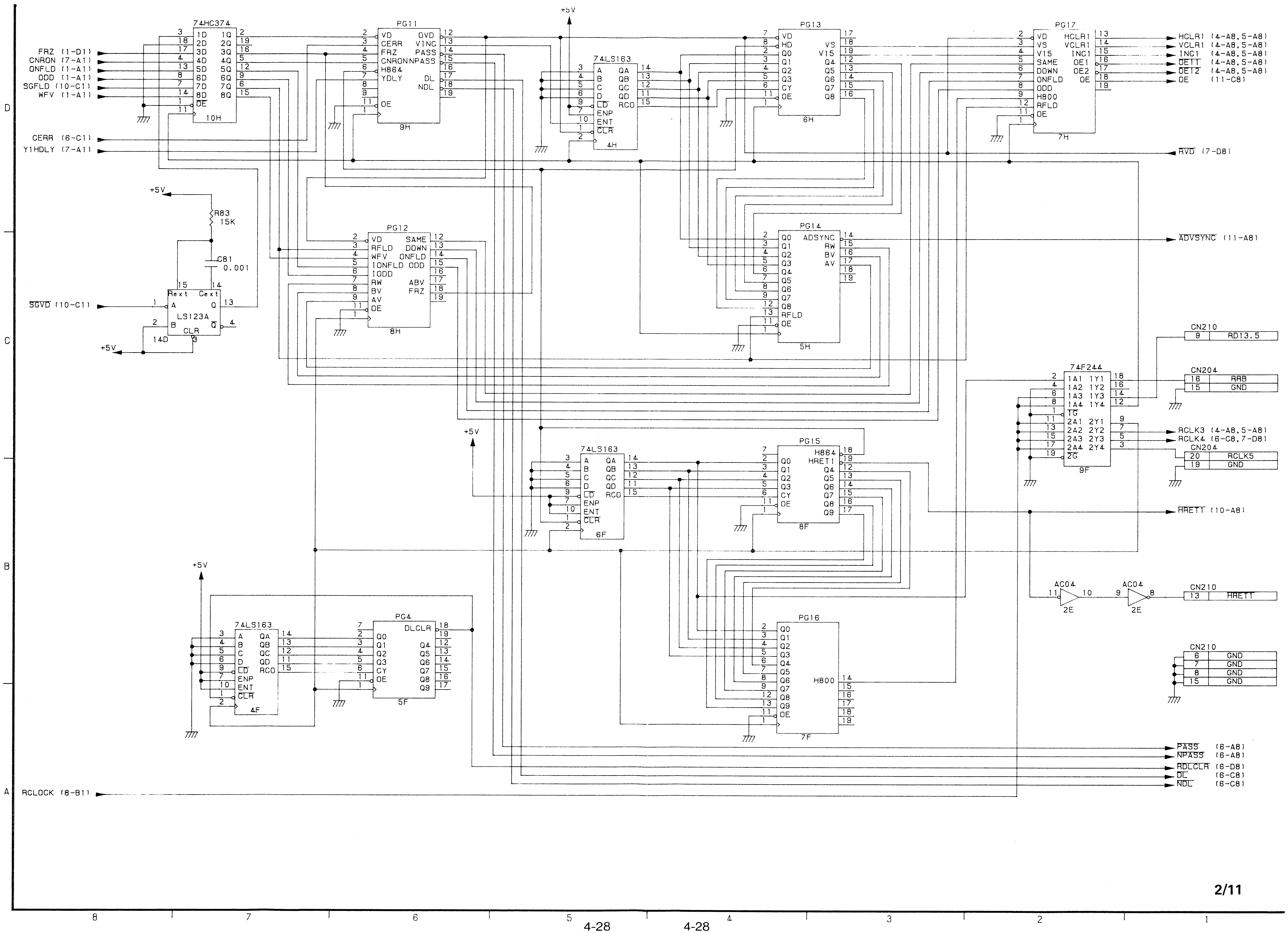
R SYNC
CN104
C494 0.0015 μF
74HC14
IC46E <18P>
R316 330
1S1588
D19
C312 220pF
C412 0.1μF
IC46F <18P>
R406 1.5k
R405 6.2k
C416 0.001 μF
L53 22μH
+5V
353(A)
IC71
R404 6.8k
C411 8pF
(6-C8) Y SYNC
R325 470
C325 FS
IC46D <18P>
R407 1.5k
JP15
ON
OFF
R455 5.1k
C443 0.001 μF
353(B)
IC75 <25N>
R456 6.8k
C444 8pF
C445 100/6.3
VR60 50k
PRS <26N>
+12V
L60 100μH
A+5V
C458 0.1μF
L65 470μH
C463 0.1μF
R469 15
C464 470/6.3
R513 1k
R468 68
C461 470/6.3
C409 0.1μF
CN103
RCD7
RCD6
RCD5
RCD4
RCD3
RCD2
RCD1
RCD0
VCCD
VCCA
OUT
MB 40778
IC76 <27U>
REF
COMP
C460 1/50
D42 1S1588
R467 82
C462 0.1μF
R466 1k
<24V> B BL VR56 200
<24U> R BL VR55 200
IC73 NJM 2233S <24T>
R465 750
VC4 25pF
R461 1k
Q87 2SC 1815
Q86 2SA 1015
R460 3k
R464 3.6k
R459 680
R458 360
C450 150pF
C448 150pF
L62 33μH
L61 33μH
C451 200pF
C449 560pF
C446 200pF
R457 750
<25M> PR OUT 5k VR58
R453 100k
R452 680
C441 100/16
<26N> PR DC
VR59 200k
R454 1k
R451 274 (F)
R450 75
353(A)
IC75 <25N>
Q84 2SA 1015
CN111
PR OUT
GND
-12V
(8-D8) D/A PR
13.5M (6-D8)
C85 220/6.3
R CLK
74HC04
IC61A <18U>
R341 470
C346 FS
IC61E <18U>
IC61D <18U>
<23N> PB OUT 5k VR53
R400 100k
R398 680
C407 0.1μF
<23P> PB DC
VR54 200k
R402 1k
R401 274 (F)
R399 75
IC71 <23P>
Q67 2SA 1015
PB OUT
GND
(8-C8) D/A PB
R409 1k
Q69 2SC 1815
Q68 2SA 1015
R411 3.6k
R412 3.6k
R410 680
R408 360
C415 150pF
C414 150pF
L54 33μH
L52 33μH
C417 200pF
C413 560pF
C410 200pF
R403 750
R413 750
VC5 25pF
IC72 NJM 2233S <23T>
74HC02
IC58B <15U>
74HC00
IC59B <16U>
R339 180
C344 220pF
IC59C <16U>
IC58C <15U>
C BL (6-C1)
78L009AP
OUT G IN
IC74 <4B>
C419 0.1μF
C420 0.1μF
R RB
74LS04
IC60D <17U>
R340 470
C345 FS
IC60A <17U>
IC60B <17U>
IC60C <17U>
+9V (6-D8)
CN102
CN104
CN101
CN103
GND
D
C
B
A
8
7
6
5
4
3
2
1

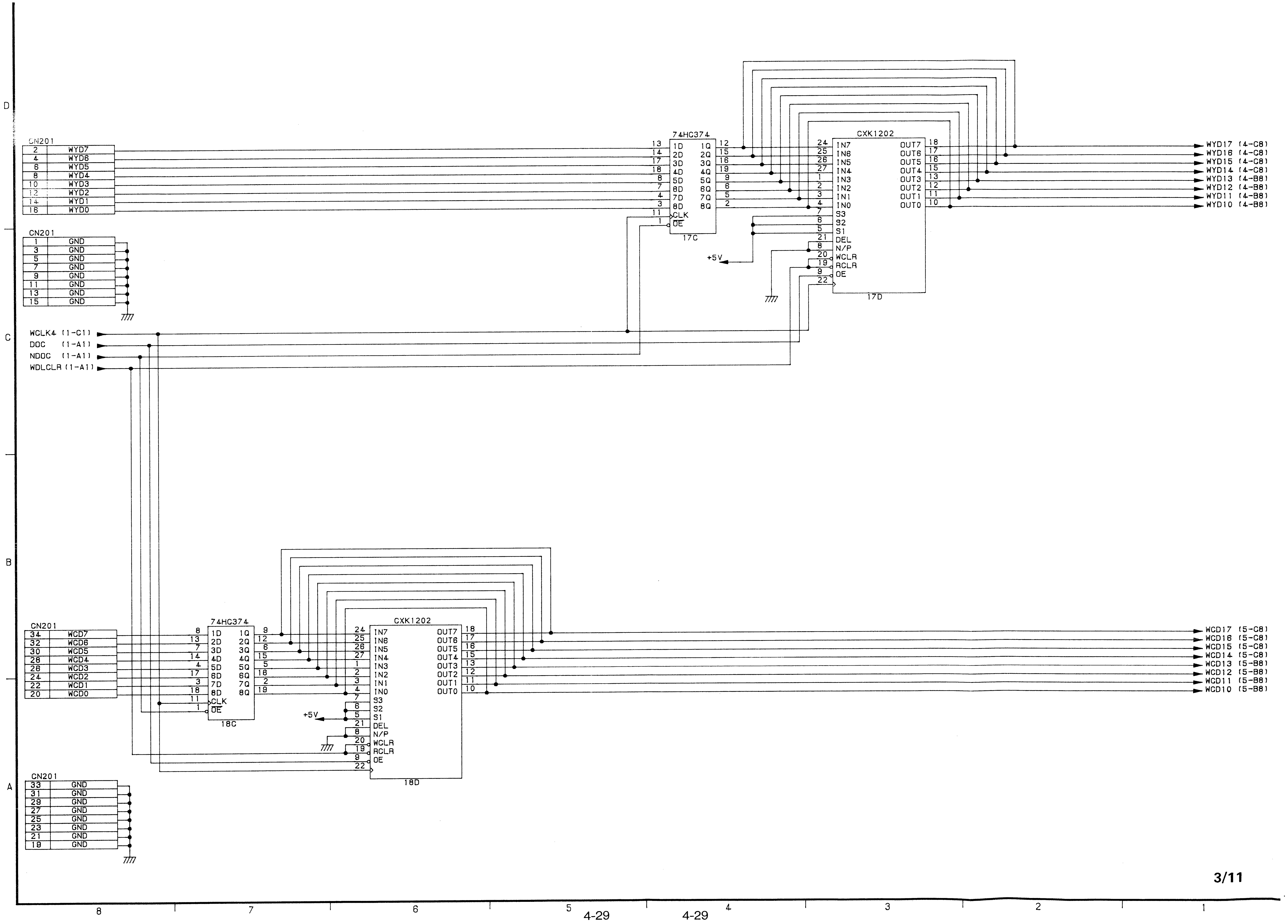

D/A PR (7-C1)
D/A PB (7-B1)
VIDEO IN (9-A8)
CONT (2-C8)
VIDEO LEVEL
VR3 10k
S1
NOR
UNITY
R394 680
R393 1.5k
353(B) IC69 <23k>
353(A) IC69 <23k>
C399 0.1μF
C398 0.1μF
C400 0.1μF
R395 22k
C402 0.001μF
<23J> IC68 4053C
<23k> TP26
R476 1k
AN612 IC63 <21J>
C362 0.1μF
R353 4.7k
<21H> R CL
VR44 500
R351 4.7k
VR29 5k
R352 150k
C364 0.1μF
R354 620
C363 0.01μF
<19H> TP46
NJM2233S IC37 <19H>
C297 0.1μF
C300 0.1μF
2SA1015 Q55
R302 1.2k
R304 1.2k
VC6 10pF
VR34 2k
R MOD <17J>
C292 0.1μF
C295 470/6.3
L38 100μH
A+5V
C483 200pF
CN104 19 LALT
<19J> B MOD
VR35 1k
C367 0.01μF
C303 91pF
L39 22μH
R307 1k
L81 4.7μH
C495 270pF
C302 0.01μF
R498 1k
R306 1k
74HC04 IC61B <18U>
(6-A1) SC
R396 1.5k
R397 680
353(B) IC70 <23H>
TP27
R477 1k
AN612 IC64 <21K>
R358 620
(6-C8) ENC C
<20k> B CL
VR46 500
R357 4.7k
R356 150k
C366 0.1μF
R355 4.7k
C404 0.1μF
353(A) IC70 <23M>
C403 0.1μF
C405 0.1μF
<23J> IC68 4053A
<19K> Q56 2SC1815
R310 4.7k
R309 5.6k
C306 0.01μF
R308 1k
C305 0.1μF
CN104 15 R HD
(4-C1) R HD
C76 47/16
R96 10k
R90 1k
Q17 2SC1815
C72 10pF
2SA1015 Q15
R92 220
C57 15pF
R93 1k
R91 1.2k
Q16 2SC1815
R82 470
R83 10k
R95 9.1k
R94 2.2k
R388 1m
C69 10/16
1S1588 D1
353(B) IC8 <17A>
R87 1.1K
R84 120k
R88 10k
R89 120k
R85 2.2k
R86 7.5k
C71 10/16
C70 10/16
R8 4.7k
R9 12K
R7 3k
C64 0.1μF
R81 1M
TX429M IC7 <15A>
C65 1/50
Q14 2SC1815
R79 300
L71 12μH
L70 12μH
C63 91pF
C61 180pF
C59 91pF
R77 68
R78 300
Q13 2SC1815
<11A>
C58 470/6.3
R76 1k
R74 620
R486 FS
C485 FS
R499 15k
R75 5.6k
R80 1.5k
<10A>
2SA1015 Q12
R73 2k
C496 5pF
R72 1.8k
C74 0.1μF
L72 470μH
C75 0.1μF
TP6
(1-D8) VIDEO
(1-D8) S-Y
+12V
-12V
+5V
A
B
C
D
8
7
6
5
4
3
2
1

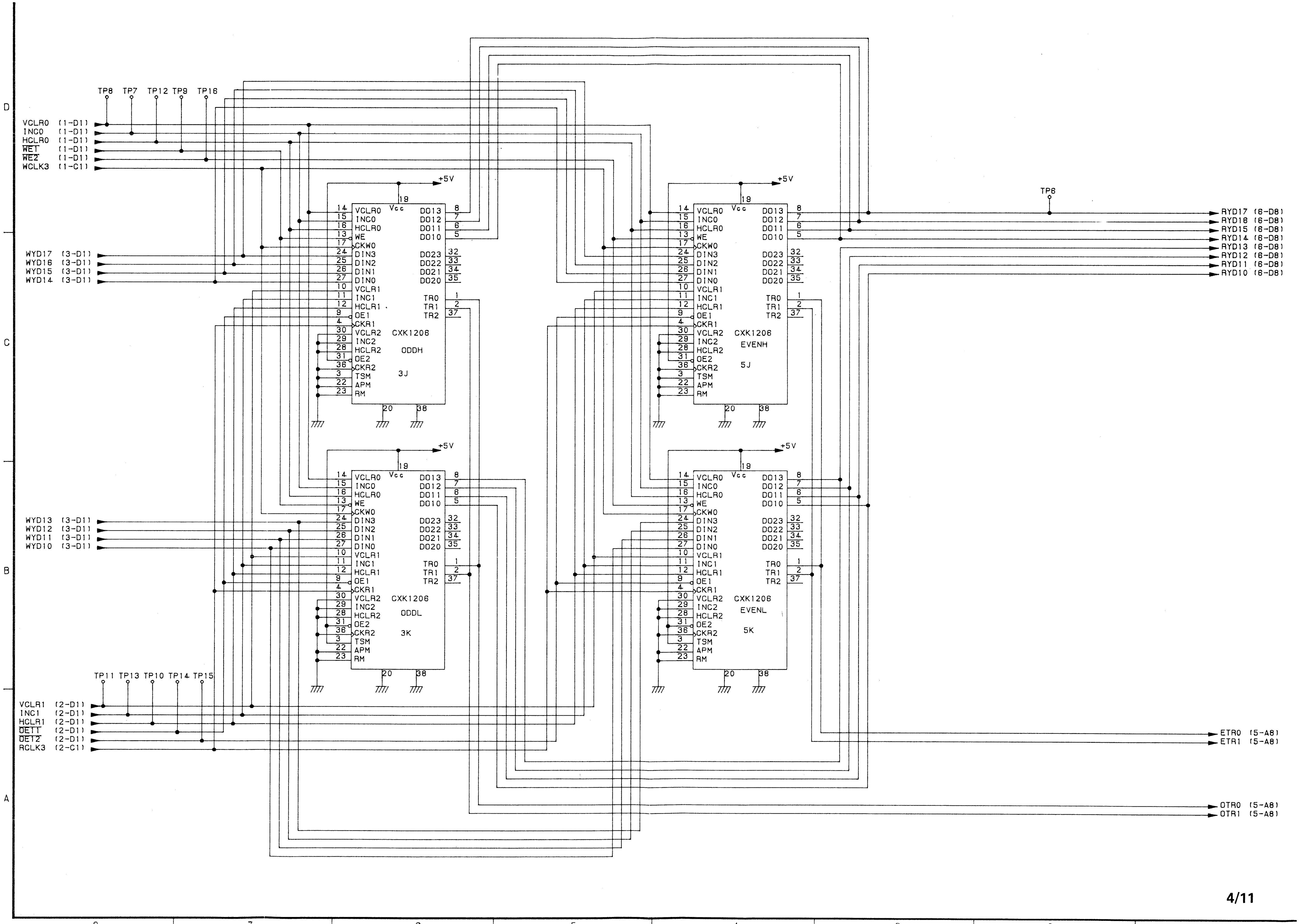

S-C IN (1-D1)
CN104
BY PASS
S-C OUT (6-C1)
JP11B
JP11A
COLOR/MONO (6-B1)
<23C>
YC BAL
1k
VR50
C OUT (6-C1)
VIDEO OUT (6-D1)
DC BIAS (6-C1)
VIDEO IN (8-B8)
S/C (1-C1) (2-C8)
R501 5.6k
R500 5.6k
Q93 2SA 1015
R502 100k
R376 5.6k
R414 68
Q63 2SA 1015
C386 100/6.3
R377 390
R379 68
Q64 2SC 1815
R378 10k
R380 2.2k
L51 56μH
VC2 30pF
JP5
C431 220/6.3
C OUT
VR57 500
R420 68
R422 332
Q72 2SA 1015
R423 332
C468 15pF
Q73 2SC 1815
R421 1k
R424 75
C429 100/6.3
R463 2k
R462 560
C452 0.1μF
Q85 2SB 1010
D22 V03C
L57 220μH
L55 470μH
C426 470/6.3
L56 220μH
C430 100/16
R419 332
R418 68
Q71 2SA 1015
R416 332
C421 15pF
Q70 2SC 1815
R415 1k
R417 75
C425 100/6.3
JP13
JP14
R390 348
C489 15pF
DCE 20-35 DL2 <23H>
R391 348
C396 47/16
R429 365
R478 348
R427 1k
Q74 2SC 1815
Q75 2SA 1015
C432 15pF
R426 402
R425 402
C422 0.1μF
R442 68
R443 1k
Q80 2SC 1815
Q81 2SA 1015
C471 15pF
R441 402
R440 402
C438 0.1μF
R444 75
R436 68
R438 1k
Q78 2SC 1815
Q79 2SA 1015
C436 15pF
R437 402
R435 402
C434 220/6.3
L59 220μH
R439 75 (F)
L58 100μH
C433 220/16
R503 910
R383 680
C500 62pF
Q66 2SA 1015
L82 33uH
Q65 2SC 1815
VR51 2k
VR66 2k
C391 470/6.3
KFACTOR <23E>
C499 47pF
R381 2.7k
VIDOUT <23D>
R382 3.9k
R384 8.2k
C393 0.1μF
DC O
R447 68
<25F> BIAS 10k VR48
R445 1k
Q82 2SC 1815
Q83 2SA 1015
C439 15pF
R448 402
R446 402
C437 0.1μF
R449 75
R433 68
R434 1k
Q76 2SC 1815
Q77 2SA 1015
C435 15pF
R431 402
R430 402
R432 75 (F)
R386 16k
VR52 5k
1S1588 D13
R387 2k
R428 75
D21 1S1588
353(A) IC67 <23E>
R389 1m
1S1588 D20
353(B) IC67
C394 0.1μF
C77 0.1μF
<23A> NJM2233S IC9
C79 47/16
R98 75 (F)
C78 47/16
R97 75 (F)
RY1
RY2
RY3
RY4
RY5
RY6
S8
S9
A
B
CN108 S-C IN GND
CN110 S-C OUT 1 GND
CN110 S-C OUT 2 GND
CN108 S-Y IN GND
CN109 S-Y OUT 1 GND
CN109 S-Y OUT 2 GND
CN107 VIDEO OUT 1 GND
CN106 VIDEO IN GND
CN107 VIDEO OUT 2 GND
CN111 Y OUT GND
CN105 +12V GND
CN105 -12V GND
CN105 +5V GND
L63
C454 100/16
C453 0.1μF
ZFB 503D-00
C456 0.1μF
L64
C455 100/16
C457 0.1μF
C459 0.1μF
L66
C466 470/6.3
C467 0.1μF
C465 0.1μF
+12V
-12V
+5V
A+5V
D+5V
D
C
B
A
8
7
6
5
4
3
2
1

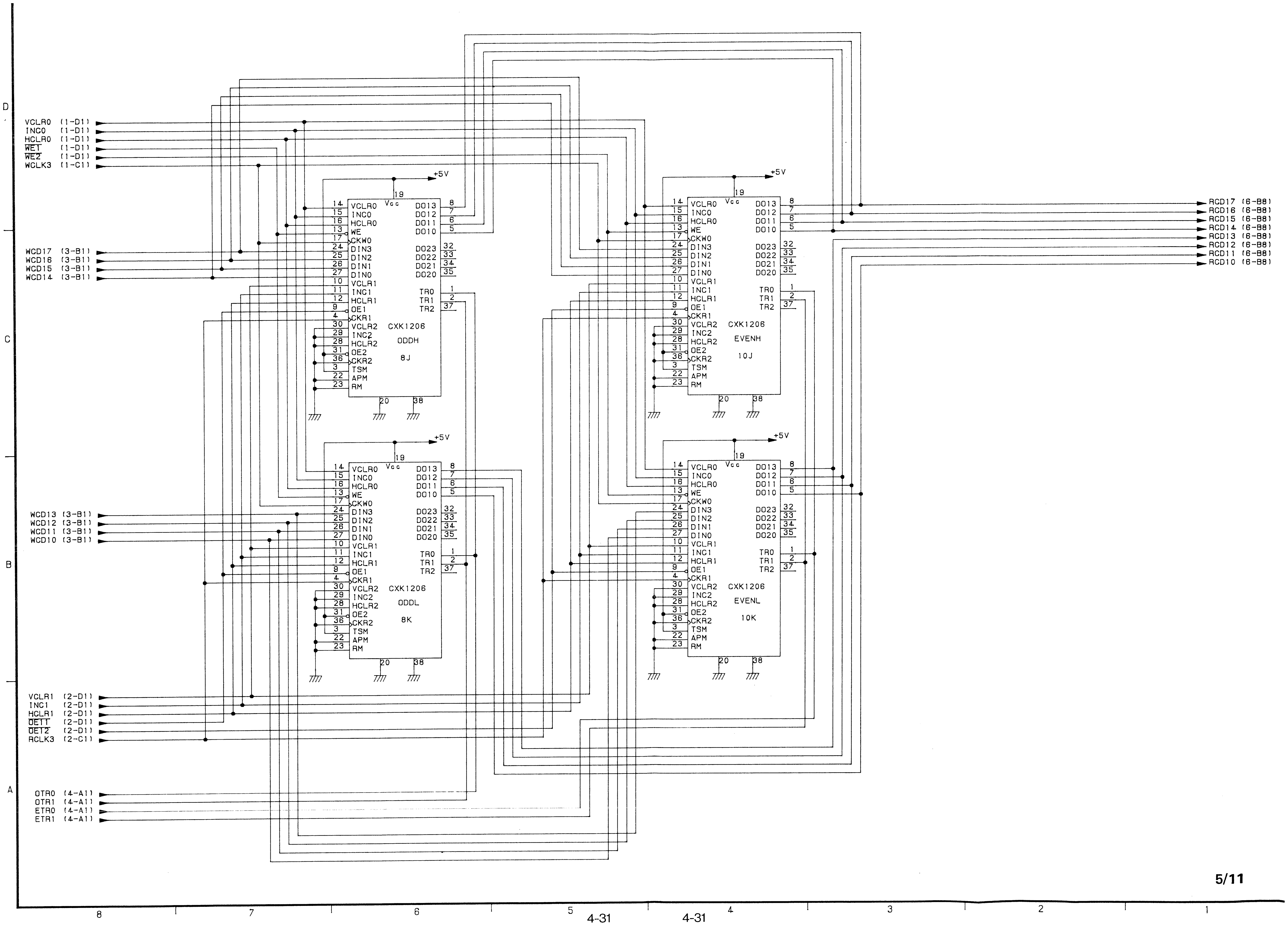
4.11 DIGITAL SCHEMATIC DIAGRAM

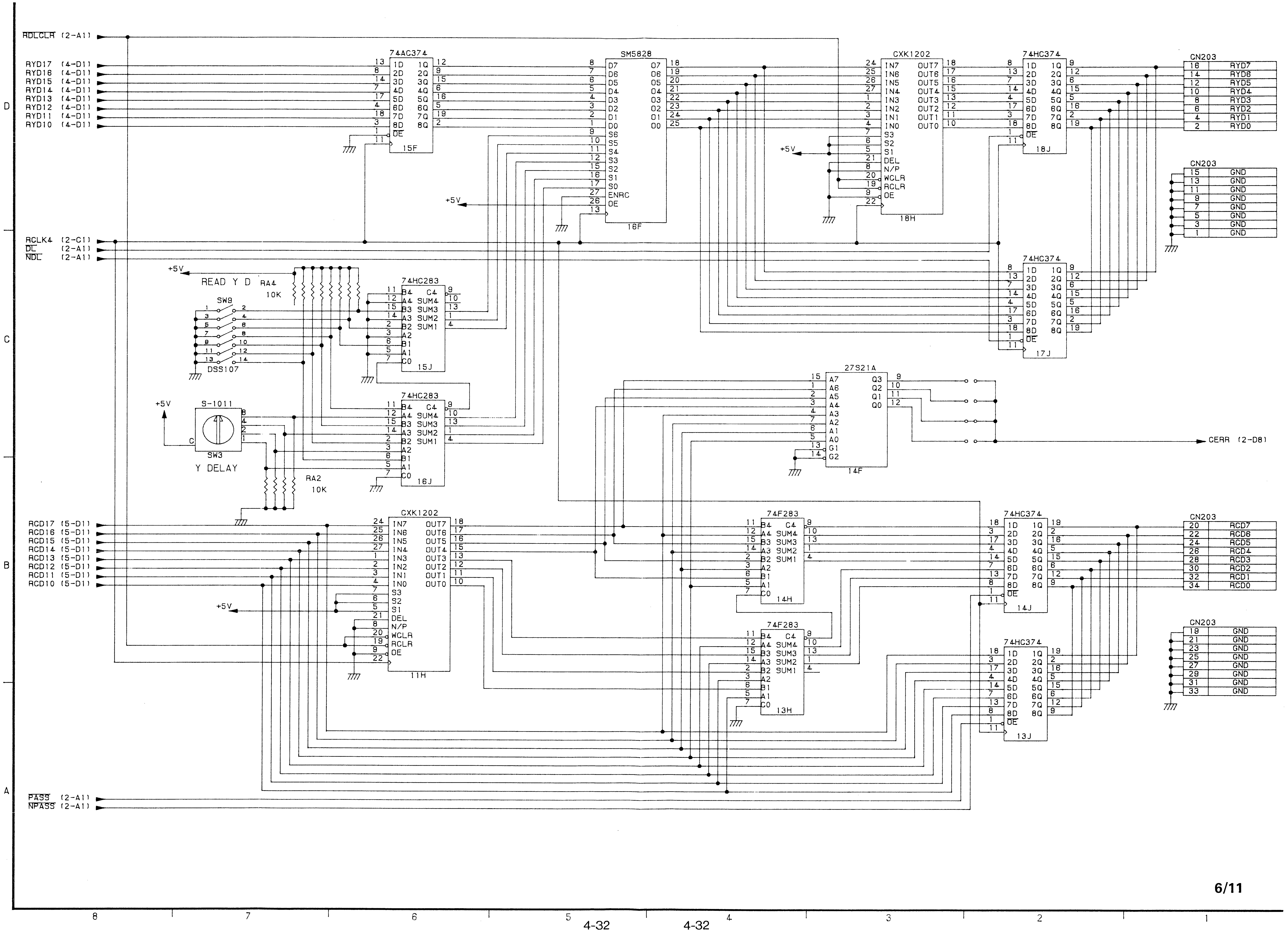

CN202
8 WHSAMP
12 SHUTTLE
10 NOVID
DOCON (8-D1)
NORF (8-D1)
FDFZ (7-C1)
FMFZ (7-C1)
74LS374
14E
TP22
PG1
VD HSAMP SHTL NOVID VE H864 NOVIDF V1 WFLD
OVD OHD VINC WFV OE
13E
+5V
74LS163
4E
PG5
VD HD Q0 Q1 Q2 Q3 CY OE
V1 VS VE Q4 Q5 Q6 Q7 Q8
6E
PG10
VD VS VE HD WFLD FRZ OE
HCLR0 VCLR0 INC0 WE1 WE2 WE
7E
HCLR0 (4-D8,5-D8)
VCLR0 (4-D8,5-D8)
INC0 (4-D8,5-D8)
WE1 (4-D8,5-D8)
WE2 (4-D8,5-D8)
FRZ (2-D8)
PG2
NOVID FDFZ FMFZ NOVIDF WFLD FID SHTL
OFRZ ONFLD ODD OE
11E
NOVIDF (7-A1)
FIELDID (7-A1)
PG6
Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 OE
5E
R82
47K
C213
0.1
Rext Cext
LS123B
A B Q CLR
14D
PG3
NORF DOCON DOC NDOC OE
10E
CN202
20 WRB
19 GND
14 WHRESET
13 GND
16 WCLP2
15 GND
74HC244
1A1 1A2 1A3 1A4 1G 2A1 2A2 2A3 2A4 2G
1Y1 1Y2 1Y3 1Y4 2Y1 2Y2 2Y3 2Y4
18F
WCLK3 (4-D8,5-D8)
WCLK4 (3-C8)
74LS163
15E
PG7
Q0 Q1 Q2 Q3 CY OE
H864 H432 Q4 Q5 Q6 Q7 Q8 Q9
16E
74LS163
8E
PG4
Q0 Q1 Q2 Q3 CY OE
DLCLR Q4 Q5 Q6 Q7 Q8 Q9
9E
PG8
Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9
HSQS HSQE CP2S CP2E OE
17E
PG9
VD HSQS HSQE CP2S CP2E SHTL
WFLD CP2 HSQR OE
18E
TP23
ONFLD (2-D8)
ODD (2-D8)
WFV (2-D8)
DOC (3-C8)
NDOC (3-C8)
WDLCLR (3-C8)
CN202
18 WVD
17 GND
VD WIDTH
VR9
20K
CN202
6 WSYNC
5 GND
LS14
15D
1N34
D9
R84
33K
C83
0.0047
R181
330
D10
R85
10K
C84
0.033
CN202
4 WCLK
3 GND
D C B A
8 7 6 5 4 3 2 1

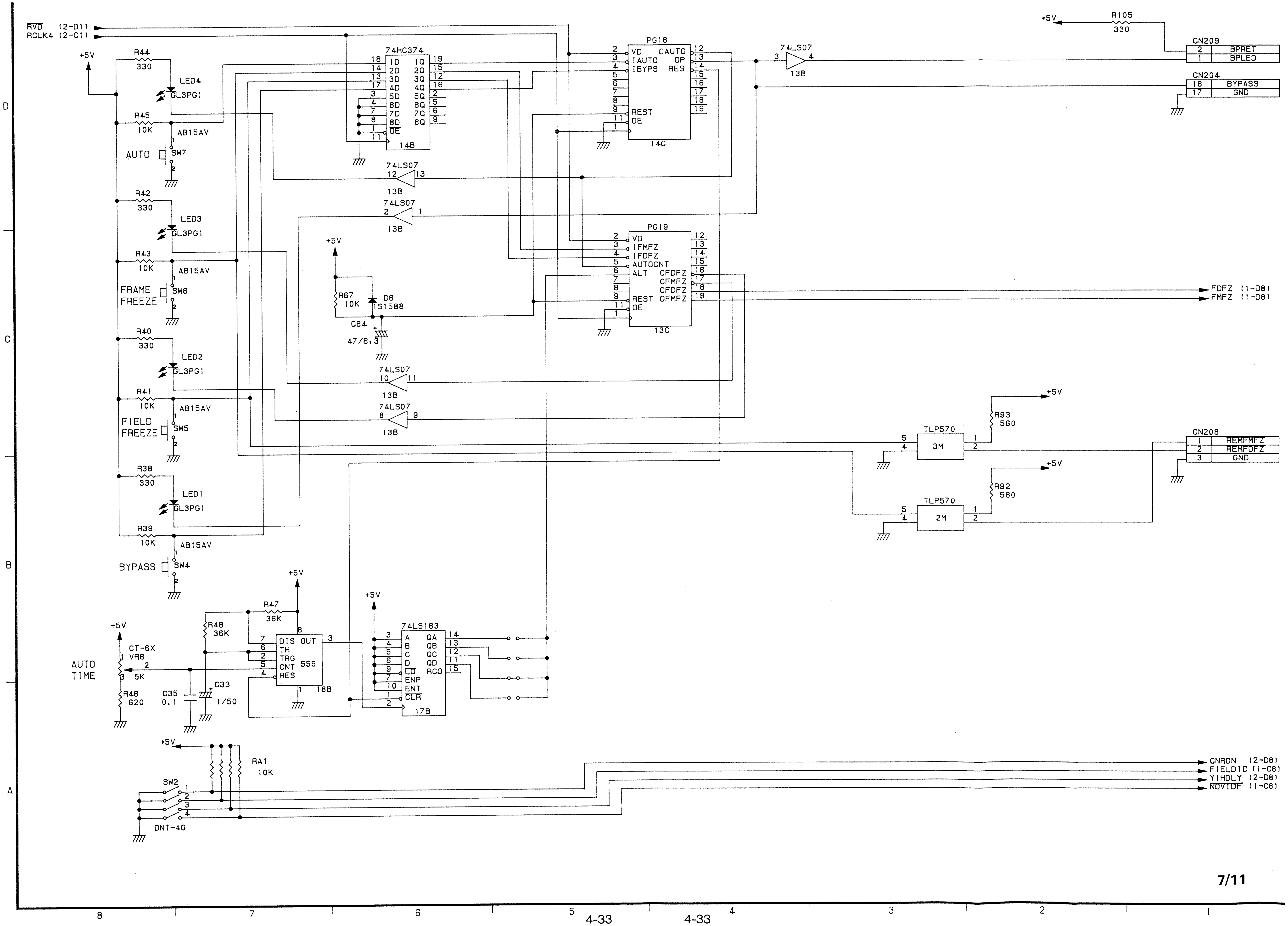

74HC374
10H
FRZ (1-D1)
CNRON (7-A1)
ONFLD (1-A1)
ODD (1-A1)
SGFLD (10-C1)
WFV (1-A1)
CERR (6-C1)
Y1HDLY (7-A1)
PG11
9H
VD
CERR
FRZ
CNRON
H864
YDLY
OE
OVD
VINC
PASS
NPASS
DL
NDL
+5V
74LS163
4H
PG13
6H
HD
Q0
Q1
Q2
Q3
CY
VS
V15
Q4
Q5
Q6
Q7
Q8
PG17
7H
SAME
DOWN
ONFLD
H800
RFLD
HCLR1
VCLR1
INC1
OE1
OE2
HCLR1 (4-A8,5-A8)
VCLR1 (4-A8,5-A8)
INC1 (4-A8,5-A8)
OET1 (4-A8,5-A8)
OET2 (4-A8,5-A8)
OE (11-C8)
RVD (7-D8)
R83
15K
C81
0.001
Rext
Cext
LS123A
14D
CLR
SGVD (10-C1)
PG12
8H
RFLD
WFV
1ONFLD
1ODD
RW
BV
AV
ABV
PG14
5H
ADVSYNC
ADVSYNC (11-A8)
CN210
RD13.5
74F244
9F
1A1 1Y1
1A2 1Y2
1A3 1Y3
1A4 1Y4
1G
2A1 2Y1
2A2 2Y2
2A3 2Y3
2A4 2Y4
2G
CN204
RRB
GND
RCLK3 (4-A8,5-A8)
RCLK4 (6-C8,7-D8)
RCLK5
6F
PG15
8F
H864
HRET1
HRET1 (10-A8)
AC04
2E
HRETT
PG16
7F
PG4
5F
DLCLR
4F
QA QB QC QD
RCO
LD
ENP
ENT
PASS (6-A8)
NPASS (6-A8)
RDLCLR (6-D8)
DL (6-C8)
NDL (6-C8)
RCLOCK (8-B1)
D
C
B
A
8
7
6
5
4
3
2
1
2/11

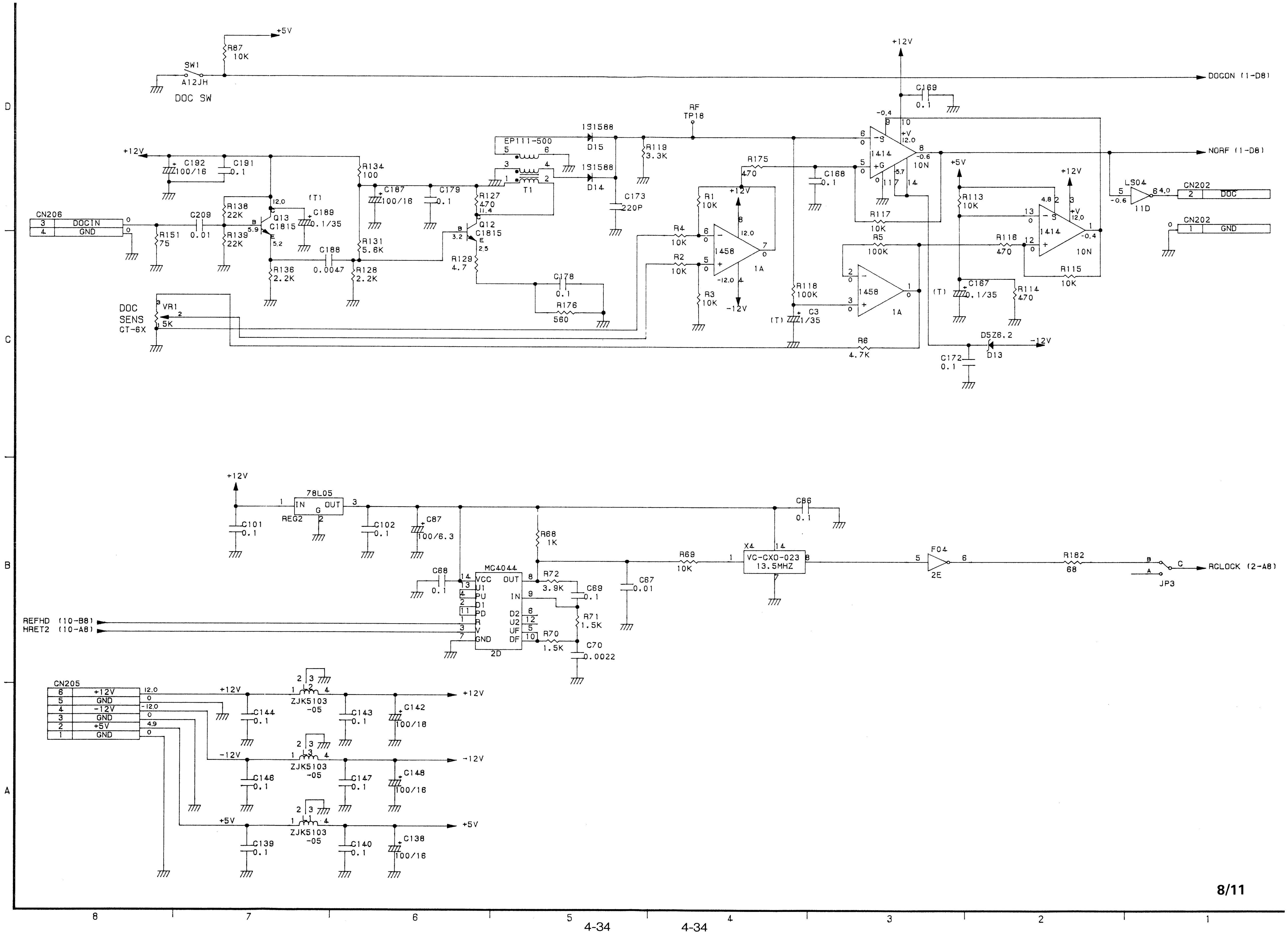

D
C
B
A
8
7
6
5
4
3
2
1
CN201
2 WYD7
4 WYD6
6 WYD5
8 WYD4
10 WYD3
12 WYD2
14 WYD1
16 WYD0
CN201
1 GND
3 GND
5 GND
7 GND
9 GND
11 GND
13 GND
15 GND
WCLK4 (1-C1)
DOC (1-A1)
NDOC (1-A1)
WDLCLR (1-A1)
74HC374
1D 2D 3D 4D 5D 6D 7D 8D CLK OE
1Q 2Q 3Q 4Q 5Q 6Q 7Q 8Q
17C
CXK1202
IN7 IN6 IN5 IN4 IN3 IN2 IN1 IN0 S3 S2 S1 DEL N/P WCLR RCLR OE
OUT7 OUT6 OUT5 OUT4 OUT3 OUT2 OUT1 OUT0
17D
+5V
WYD17 (4-C8)
WYD16 (4-C8)
WYD15 (4-C8)
WYD14 (4-C8)
WYD13 (4-B8)
WYD12 (4-B8)
WYD11 (4-B8)
WYD10 (4-B8)
CN201
34 WCD7
32 WCD6
30 WCD5
28 WCD4
26 WCD3
24 WCD2
22 WCD1
20 WCD0
74HC374
18C
CXK1202
18D
+5V
WCD17 (5-C8)
WCD16 (5-C8)
WCD15 (5-C8)
WCD14 (5-C8)
WCD13 (5-B8)
WCD12 (5-B8)
WCD11 (5-B8)
WCD10 (5-B8)
CN201
33 GND
31 GND
29 GND
27 GND
25 GND
23 GND
21 GND
19 GND


TP8 TP7 TP12 TP9 TP16
VCLR0 (1-D1)
INC0 (1-D1)
HCLR0 (1-D1)
WE1 (1-D1)
WE2 (1-D1)
WCLK3 (1-C1)
WYD17 (3-D1)
WYD16 (3-D1)
WYD15 (3-D1)
WYD14 (3-D1)
WYD13 (3-D1)
WYD12 (3-D1)
WYD11 (3-D1)
WYD10 (3-D1)
TP11 TP13 TP10 TP14 TP15
VCLR1 (2-D1)
INC1 (2-D1)
HCLR1 (2-D1)
OE11 (2-D1)
OE12 (2-D1)
RCLK3 (2-C1)
+5V
19
Vcc
VCLR0 INC0 HCLR0 WE CKW0 DIN3 DIN2 DIN1 DIN0 VCLR1 INC1 HCLR1 OE1 CKR1 VCLR2 INC2 HCLR2 OE2 CKR2 TSM APM RM
DO13 DO12 DO11 DO10 DO23 DO22 DO21 DO20 TR0 TR1 TR2
20 38
CXK1206
ODDH
3J
CXK1206
EVENH
5J
CXK1206
ODDL
3K
CXK1206
EVENL
5K
TP6
RYD17 (6-D8)
RYD16 (6-D8)
RYD15 (6-D8)
RYD14 (6-D8)
RYD13 (6-D8)
RYD12 (6-D8)
RYD11 (6-D8)
RYD10 (6-D8)
ETR0 (5-A8)
ETR1 (5-A8)
OTR0 (5-A8)
OTR1 (5-A8)
D C B A
8 7 6 5 4 3 2 1
4/11

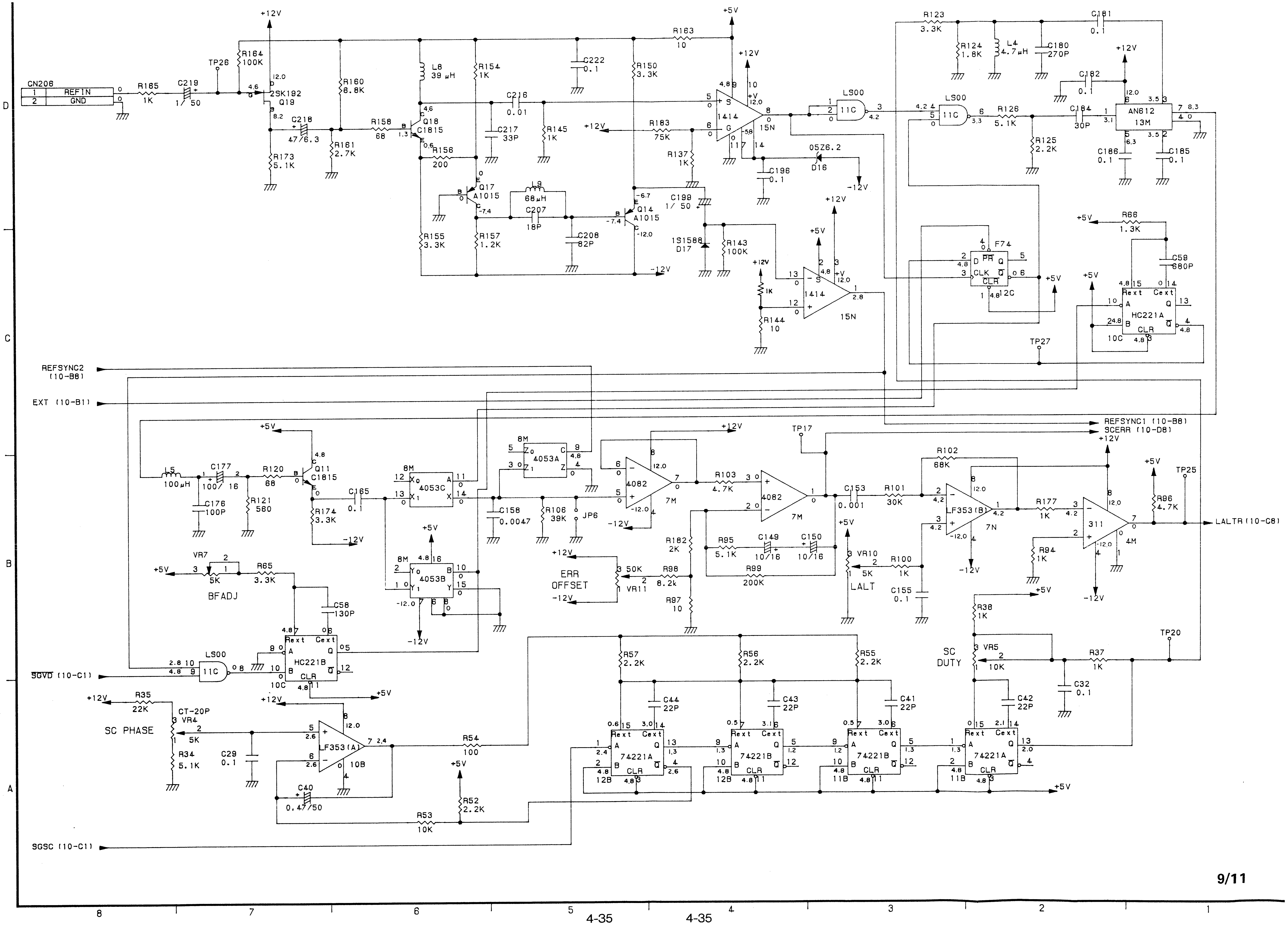

D
C
B
A
8
7
6
5
4
3
2
1
VCLR0 (1-D1)
INC0 (1-D1)
HCLR0 (1-D1)
WE1 (1-D1)
WE2 (1-D1)
WCLK3 (1-C1)
WCD17 (3-B1)
WCD16 (3-B1)
WCD15 (3-B1)
WCD14 (3-B1)
WCD13 (3-B1)
WCD12 (3-B1)
WCD11 (3-B1)
WCD10 (3-B1)
VCLR1 (2-D1)
INC1 (2-D1)
HCLR1 (2-D1)
OE11 (2-D1)
OE12 (2-D1)
RCLK3 (2-C1)
OTR0 (4-A1)
OTR1 (4-A1)
ETR0 (4-A1)
ETR1 (4-A1)
RCD17 (6-B8)
RCD16 (6-B8)
RCD15 (6-B8)
RCD14 (6-B8)
RCD13 (6-B8)
RCD12 (6-B8)
RCD11 (6-B8)
RCD10 (6-B8)
+5V
19
Vcc
14 VCLR0
15 INC0
16 HCLR0
13 WE
17 CKW0
24 DIN3
25 DIN2
26 DIN1
27 DIN0
10 VCLR1
11 INC1
12 HCLR1
9 OE1
4 CKR1
30 VCLR2
29 INC2
28 HCLR2
31 OE2
36 CKR2
3 TSM
22 APM
23 RM
DO13 8
DO12 7
DO11 6
DO10 5
DO23 32
DO22 33
DO21 34
DO20 35
TR0 1
TR1 2
TR2 37
20
38
CXK1206
ODDH
8J
CXK1206
ODDL
8K
CXK1206
EVENH
10J
CXK1206
EVENL
10K


RDLCLR (2-A1)
RYD17 (4-D1)
RYD16 (4-D1)
RYD15 (4-D1)
RYD14 (4-D1)
RYD13 (4-D1)
RYD12 (4-D1)
RYD11 (4-D1)
RYD10 (4-D1)
74AC374
15F
SM5828
16F
CXK1202
18H
74HC374
18J
17J
CN203
RYD7
RYD6
RYD5
RYD4
RYD3
RYD2
RYD1
RYD0
GND
+5V
RCLK4 (2-C1)
DL (2-A1)
NDL (2-A1)
READ Y D
RA4
10K
SW9
DSS107
74HC283
15J
16J
S-1011
SW3
Y DELAY
RA2
10K
27S21A
14F
CERR (2-D8)
RCD17 (5-D1)
RCD16 (5-D1)
RCD15 (5-D1)
RCD14 (5-D1)
RCD13 (5-D1)
RCD12 (5-D1)
RCD11 (5-D1)
RCD10 (5-D1)
CXK1202
11H
74F283
14H
13H
74HC374
14J
13J
RCD7
RCD6
RCD5
RCD4
RCD3
RCD2
RCD1
RCD0
PASS (2-A1)
NPASS (2-A1)
D
C
B
A
8
7
6
5
4
3
2
1

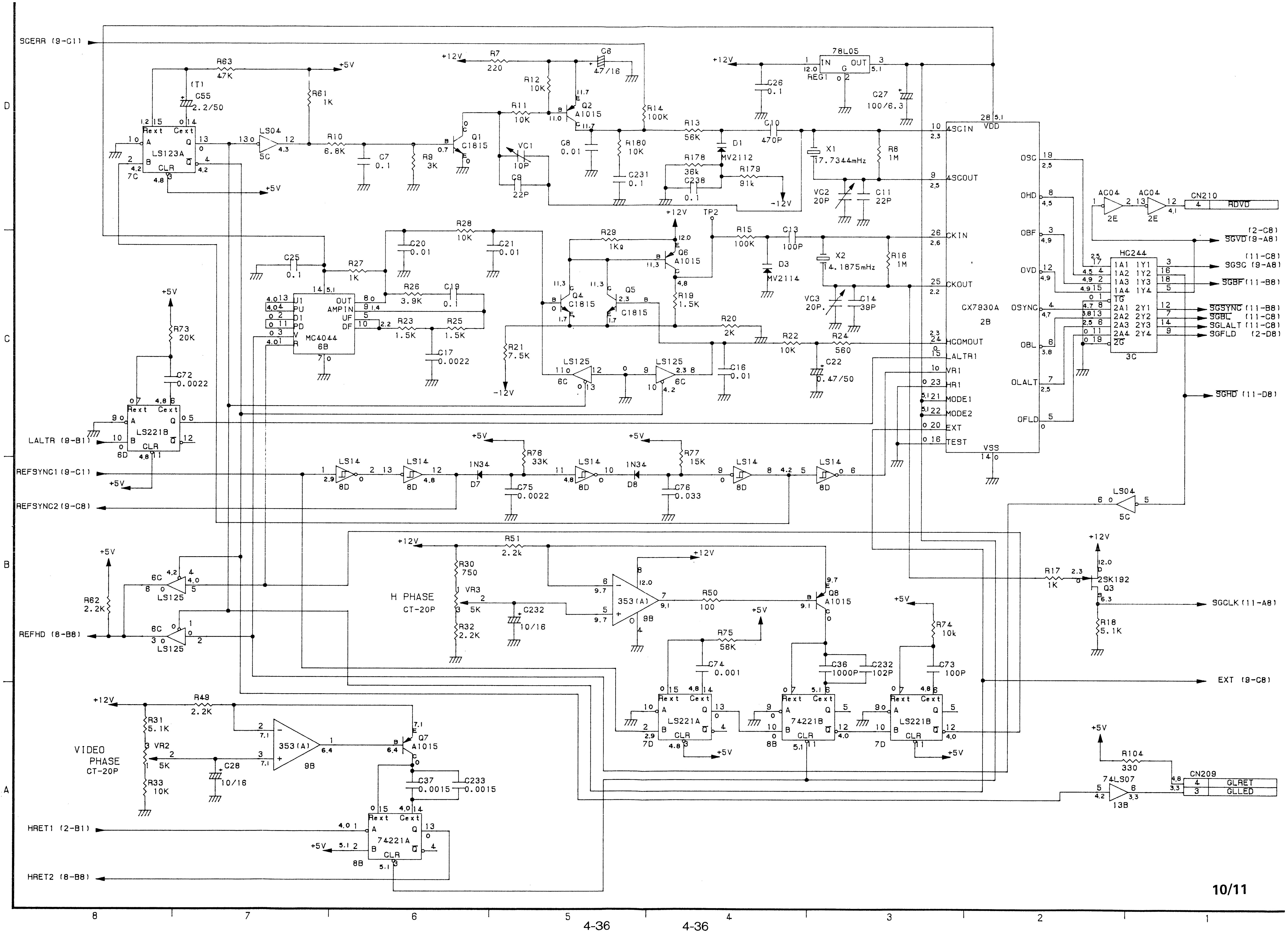

RVD (2-D1)
RCLK4 (2-C1)
+5V
R44
330
LED4
GL3PG1
R45
10K
AB15AV
AUTO
SW7
R42
330
LED3
GL3PG1
R43
10K
AB15AV
FRAME
FREEZE
SW6
R40
330
LED2
GL3PG1
R41
10K
AB15AV
FIELD
FREEZE
SW5
R38
330
LED1
GL3PG1
R39
10K
AB15AV
BYPASS
SW4
74HC374
1D 1Q
2D 2Q
3D 3Q
4D 4Q
5D 5Q
6D 6Q
7D 7Q
8D 8Q
OE
14B
74LS07
13B
PG18
VD
1AUTO
1BYPS
OAUTO
OP
RES
REST
OE
14C
PG19
VD
IFMFZ
IFDFZ
AUTOCNT
ALT
CFDFZ
CFMFZ
OFDFZ
OFMFZ
REST
OE
13C
R67
10K
D6
1S1588
C64
47/6.3
R105
330
CN209
BPRET
BPLED
CN204
BYPASS
GND
FDFZ (1-D8)
FMFZ (1-D8)
R93
560
TLP570
3M
R92
560
TLP570
2M
CN208
REMFMFZ
REMFDFZ
GND
R47
36K
R48
36K
DIS OUT
TH
TRG
CNT
RES
555
18B
AUTO
TIME
CT-6X
VR6
5K
R46
620
C35
0.1
C33
1/50
74LS163
A QA
B QB
C QC
D QD
LD RCO
ENP
ENT
CLR
17B
RA1
10K
SW2
DNT-4G
CNRON (2-D8)
FIELDID (1-C8)
Y1HDLY (2-D8)
NOVIDF (1-C8)
D
C
B
A
8
7
6
5
4
3
2
1

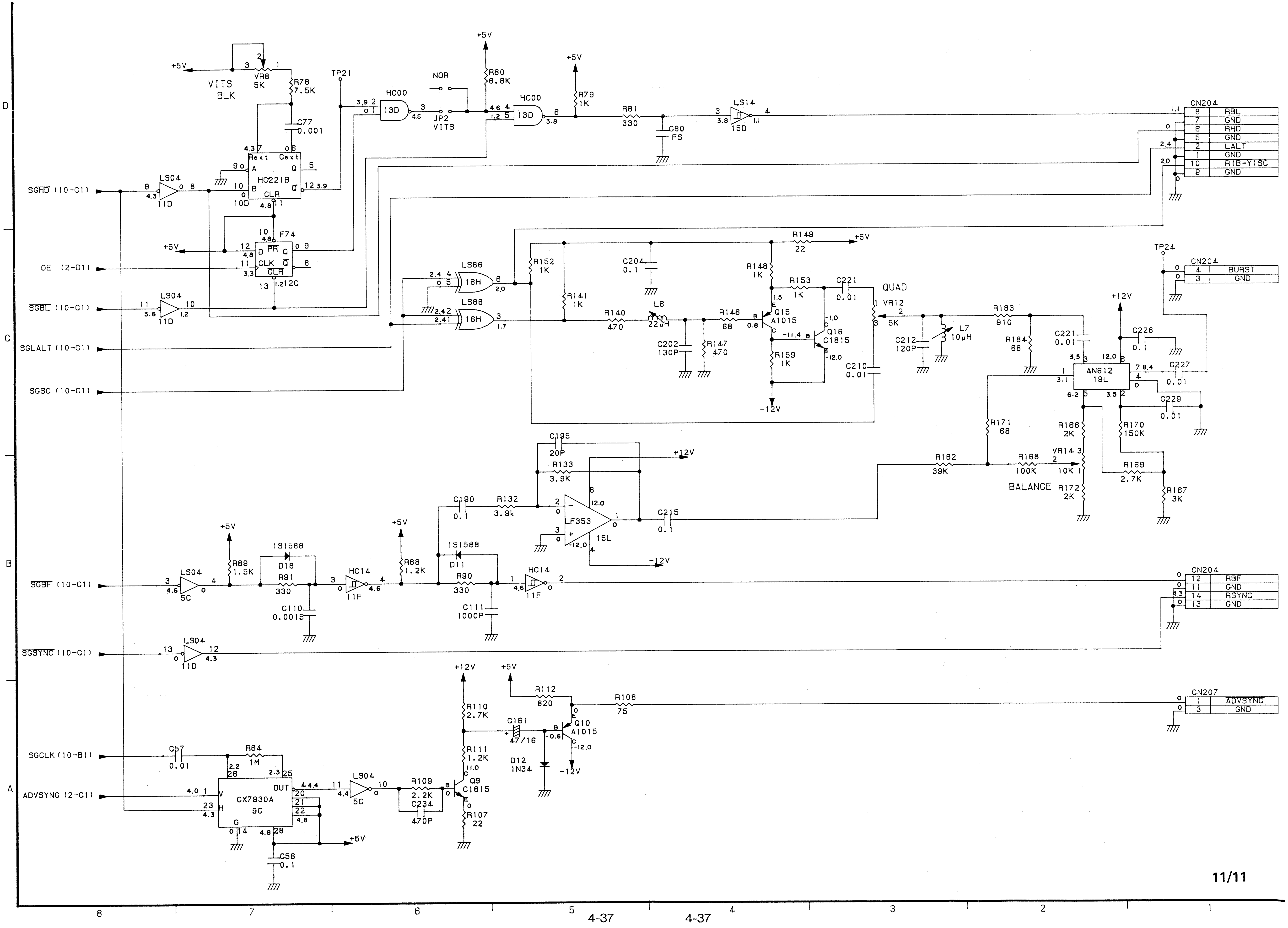


+5V
R87 10K
SW1 A12JH
DOC SW
DOCON (1-D8)
+12V
C169 0.1
RF TP18
1S1588 D15
1S1588 D14
EP111-500
T1
R119 3.3K
C173 220P
R175 470
C168 0.1
1414
10N
NORF (1-D8)
+12V
C192 100/16
C191 0.1
R134 100
C187 100/16
C179 0.1
R127 470
Q12 C1815
R129 4.7
C189 0.1/35
Q13 C1815
R138 22K
R139 22K
R136 2.2K
C188 0.0047
R131 5.6K
R128 2.2K
CN206
3 DOCIN
4 GND
C209 0.01
R151 75
C178 0.1
R176 560
R1 10K
R4 10K
R2 10K
R3 10K
1458
1A
-12V
R118 100K
C3 1/35
R117 10K
R5 100K
R6 4.7K
+5V
R113 10K
C167 0.1/35
R114 470
R116 470
R115 10K
LS04 11D
CN202
2 DOC
1 GND
D5Z6.2 D13
C172 0.1
DOC SENS CT-6X
VR1 1.5K
78L05 REG2
IN OUT G
C101 0.1
C102 0.1
C87 100/6.3
C86 0.1
R68 1K
C68 0.1
MC4044 2D
VCC OUT U1 PU D1 PD R V GND IN D2 U2 UF DF
R72 3.9K
C69 0.1
R71 1.5K
R70 1.5K
C70 0.0022
C67 0.01
R69 10K
X4 VC-CXO-023 13.5MHZ
F04 2E
R182 68
JP3
RCLOCK (2-A8)
REFHD (10-B8)
HRET2 (10-A8)
CN205
6 +12V
5 GND
4 -12V
3 GND
2 +5V
1 GND
ZJK5103 -05
C144 0.1
C143 0.1
C142 100/16
C146 0.1
C147 0.1
C148 100/16
C139 0.1
C140 0.1
C138 100/16
-12V
+5V
D
C
B
A
8
7
6
5
4
3
2
1


CN206
1 REFIN
2 GND
R165 1K
C219 1/50
TP26
R164 100K
+12V
2SK192 Q19
C218 47/6.3
R173 5.1K
R160 6.8K
R161 2.7K
R158 68
Q18 C1815
L8 39 µH
R156 200
R154 1K
Q17 A1015
L9 68µH
C207 18P
R155 3.3K
R157 1.2K
C216 0.01
C217 33P
C222 0.1
R145 1K
C208 82P
R150 3.3K
Q14 A1015
R163 10
+5V
R183 75K
R137 1K
C199 1/50
1S1588 D17
R143 100K
1414 15N
C196 0.1
05Z6.2 D16
-12V
R1K
R144 10
LS00 11C
R123 3.3K
R124 1.8K
L4 4.7µH
C180 270P
C181 0.1
C182 0.1
R126 5.1K
R125 2.2K
C184 30P
AN612 13M
C186 0.1
C185 0.1
F74 12C
R66 1.3K
C59 680P
HC221A 10C
TP27
REFSYNC2 (10-B8)
EXT (10-B1)
REFSYNC1 (10-B8)
SCERR (10-D8)
L5 100µH
C177 100/16
C176 100P
R120 68
R121 560
Q11 C1815
R174 3.3K
C165 0.1
8M 4053C
8M 4053A
8M 4053B
C158 0.0047
R106 39K
JP6
ERR OFFSET
50K VR11
R98 8.2k
R97 10
R182 2K
4082 7M
R103 4.7K
TP17
R95 5.1K
C149 10/16
C150 10/16
R99 200K
C153 0.001
R101 30K
R102 68K
LF353(B) 7N
VR10 5K
LALT
R100 1K
C155 0.1
R177 1K
311 4M
R94 1K
R96 4.7K
TP25
LALTR (10-C8)
VR7 5K
R65 3.3K
BFADJ
C58 130P
HC221B 10C
SGVD (10-C1)
R35 22K
CT-20P VR4 5K
SC PHASE
R34 5.1K
C29 0.1
LF353(A) 10B
C40 0.47/50
R54 100
R52 2.2K
R53 10K
SGSC (10-C1)
R57 2.2K
R56 2.2K
R55 2.2K
C44 22P
C43 22P
C41 22P
C42 22P
74221A 12B
74221B 12B
74221B 11B
74221A 11B
R38 1K
VR5 10K
SC DUTY
R37 1K
C32 0.1
TP20
A
B
C
D
8
7
6
5
4
3
2
1
9/11

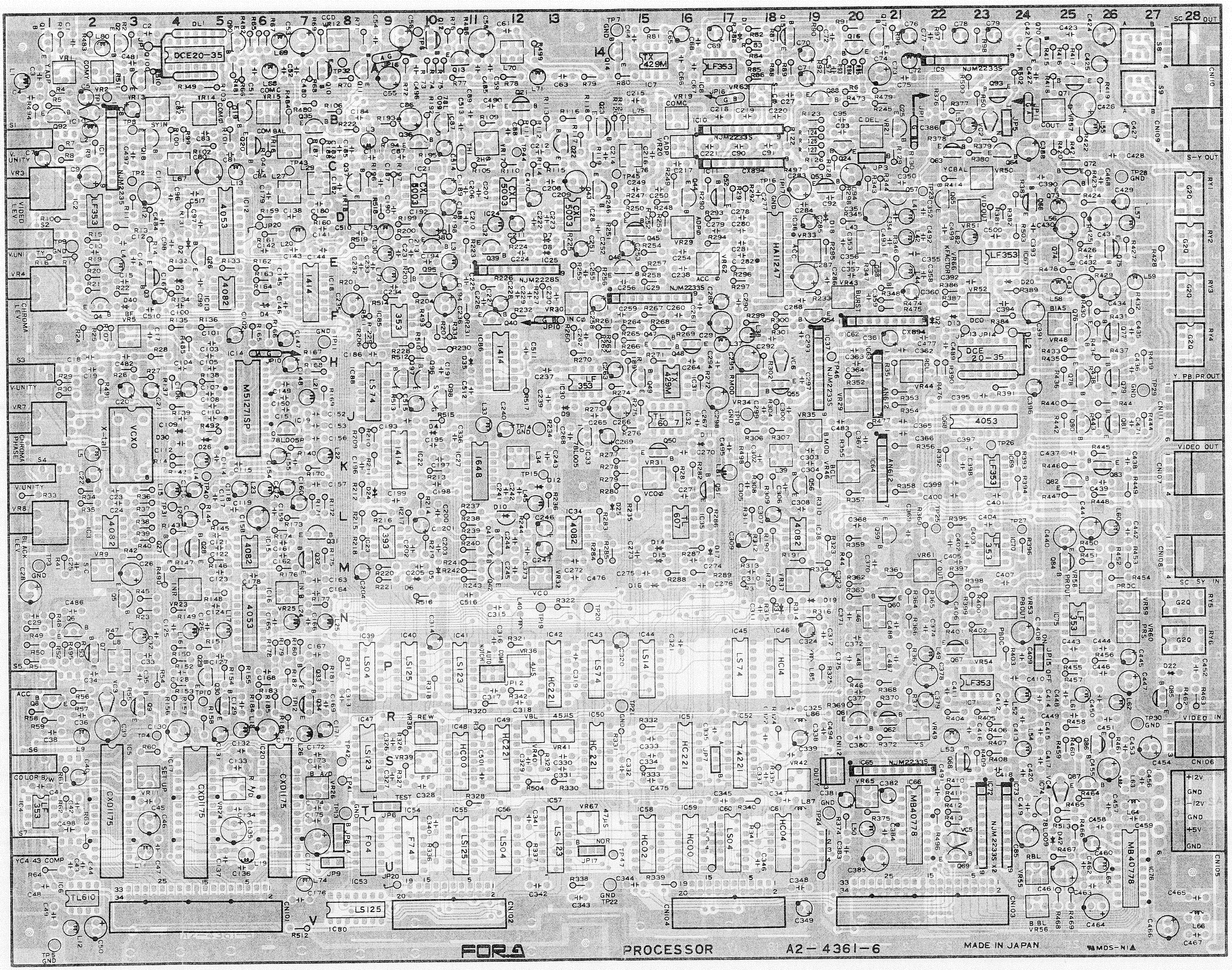
4-35


SCERR (9-C1)
LALTR (9-B1)
REFSYNC1 (9-C1)
REFSYNC2 (9-C8)
REFHD (8-B8)
HRET1 (2-B1)
HRET2 (8-B8)
R63 47K
C55 2.2/50
R61 1K
LS123A
LS04 5C
R10 6.8K
C7 0.1
R9 3K
Q1 C1815
+12V
R7 220
R12 10K
R11 10K
Q2 A1015
C6 47/16
R14 100K
C8 0.01
VC1 10P
C9 22P
R180 10K
C231 0.1
R13 56K
D1 MV2112
R178 36k
C238 0.1
R179 91k
-12V
C10 470P
C26 0.1
78L05
IN OUT G
REG1
C27 100/6.3
X1 17.7344mHz
R8 1M
VC2 20P
C11 22P
C25 0.1
R27 1K
MC4044 6B
U1 PU D1 PD V R
OUT AMPIN UF DF
R28 10K
C20 0.01
C21 0.01
R26 3.9K
C19 0.1
R23 1.5K
R25 1.5K
C17 0.0022
R21 7.5K
R29 1KΩ
Q4 C1815
Q5 C1815
Q6 A1015
TP2
R15 100K
C13 100P
D3 MV2114
X2 14.1875mHz
R16 1M
VC3 20P
C14 39P
R19 1.5K
R20 2K
R22 10K
R24 560
C22 0.47/50
C16 0.01
LS125 6C
R73 20K
C72 0.0022
LS221B 6D
CX7930A 2B
4SCIN 4SCOUT CKIN CKOUT HCOMOUT LALTR1 VR1 HR1 MODE1 MODE2 EXT TEST VDD VSS
OSC OHD OBF OVD OSYNC OBL OLALT OFLD
AC04 2E
CN210 RDVD
SGVD (9-A8) (2-C8)
HC244 3C
1A1 1A2 1A3 1A4 1G 2A1 2A2 2A3 2A4 2G
1Y1 1Y2 1Y3 1Y4 2Y1 2Y2 2Y3 2Y4
SGSC (9-A8) (11-C8)
SGBF (11-B8)
SGSYNC (11-B8)
SGBL (11-C8)
SGLALT (11-C8)
SGFLD (2-D8)
SGHD (11-D8)
LS14 8D
1N34 D7
1N34 D8
R76 33K
R77 15K
C75 0.0022
C76 0.033
H PHASE CT-20P
R51 2.2k
R30 750
VR3 5K
R32 2.2K
C232 10/16
353(A) 9B
R50 100
Q8 A1015
R75 56K
C74 0.001
C36 1000P
C232 102P
R74 10k
C73 100P
LS221A 7D
74221B 8B
LS221B 7D
R17 1K
2SK192 Q3
R18 5.1K
SGCLK (11-A8)
EXT (9-C8)
R62 2.2K
VIDEO PHASE CT-20P
R31 5.1K
VR2 5K
R33 10K
R49 2.2K
C28 10/16
353(A) 9B
Q7 A1015
C37 0.0015
C233 0.0015
74221A 8B
R104 330
74LS07 13B
CN209 GLRET GLLED
Rext Cext A B Q Q̄ CLR
D C B A
8 7 6 5 4 3 2 1

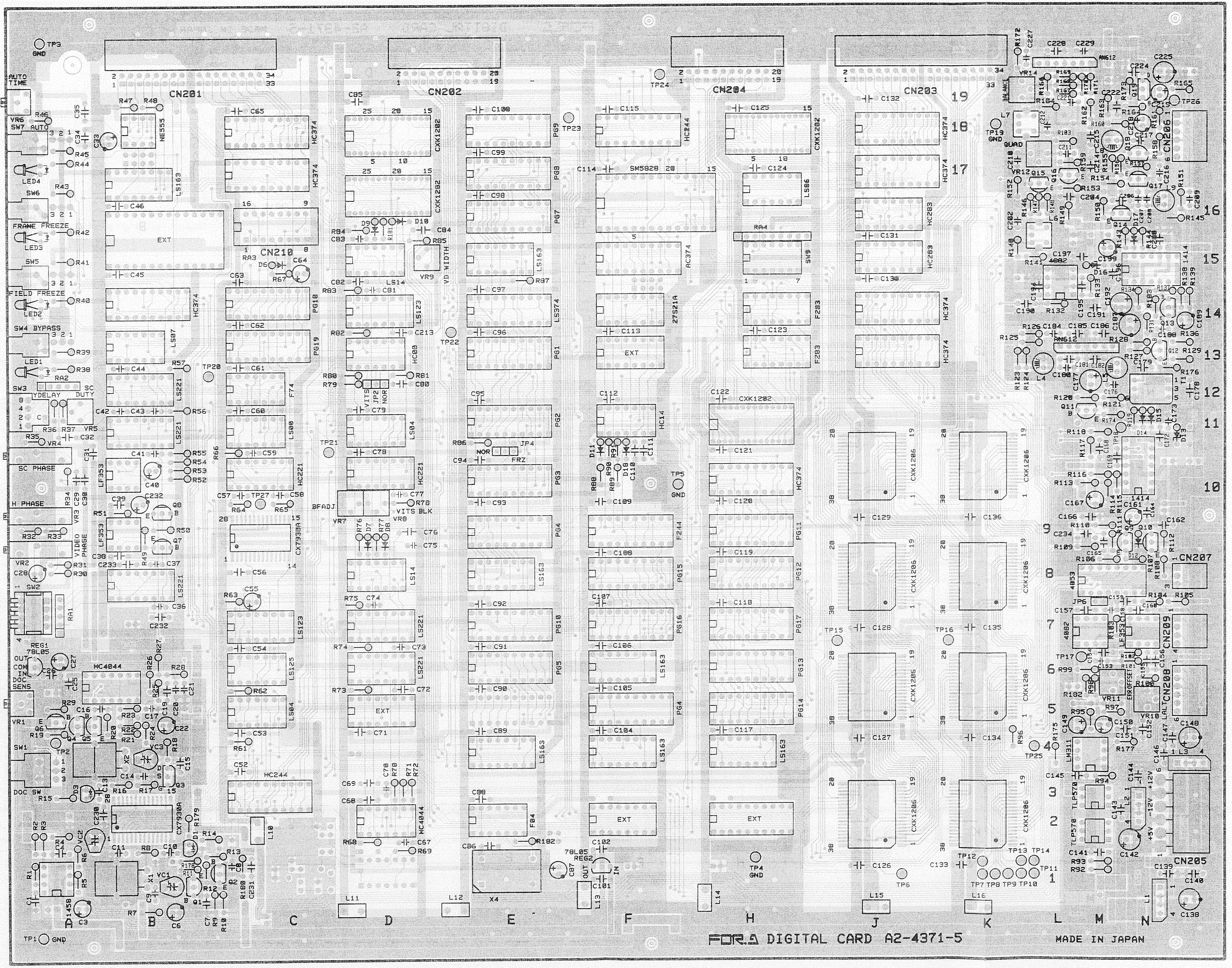


VITS
BLK
VR8
5K
R78
7.5K
C77
0.001
HC221B
Rext
Cext
CLR
TP21
HC00
13D
NOR
JP2
VITS
R80
6.8K
R79
1K
R81
330
C80
FS
LS14
15D
CN204
RBL
GND
RHD
GND
LALT
GND
R(B-Y)SC
GND
SGHD (10-C1)
LS04
11D
F74
PR
CLK
CLR
12C
OE (2-D1)
SGBL (10-C1)
SGLALT (10-C1)
SGSC (10-C1)
LS86
16H
R152
1K
R141
1K
R140
470
L6
22μH
C202
130P
R147
470
R146
68
C204
0.1
R149
22
R148
1K
R153
1K
C221
0.01
Q15
A1015
Q16
C1815
R159
1K
C210
0.01
QUAD
VR12
5K
C212
120P
L7
10μH
R183
910
R184
68
C221
0.01
AN612
19L
C228
0.1
C227
0.01
C229
0.01
TP24
CN204
BURST
GND
R171
68
R166
2K
R170
150K
R162
39K
R168
100K
VR14
10K
BALANCE
R172
2K
R169
2.7K
R167
3K
C195
20P
R133
3.9K
C190
0.1
R132
3.9k
LF353
15L
C215
0.1
SGBF (10-C1)
LS04
5C
R89
1.5K
1S1588
D18
R91
330
C110
0.0015
HC14
11F
R88
1.2K
1S1588
D11
R90
330
C111
1000P
CN204
RBF
GND
RSYNC
GND
SGSYNC (10-C1)
LS04
11D
R110
2.7K
R112
820
R108
75
C161
47/16
Q10
A1015
R111
1.2K
D12
1N34
CN207
ADVSYNC
GND
SGCLK (10-B1)
C57
0.01
R64
1M
ADVSYNC (2-C1)
CX7930A
9C
OUT
LS04
5C
R109
2.2K
C234
470P
Q9
C1815
R107
22
C56
0.1
+5V
+12V
-12V
D
C
B
A
8
7
6
5
4
3
2
1

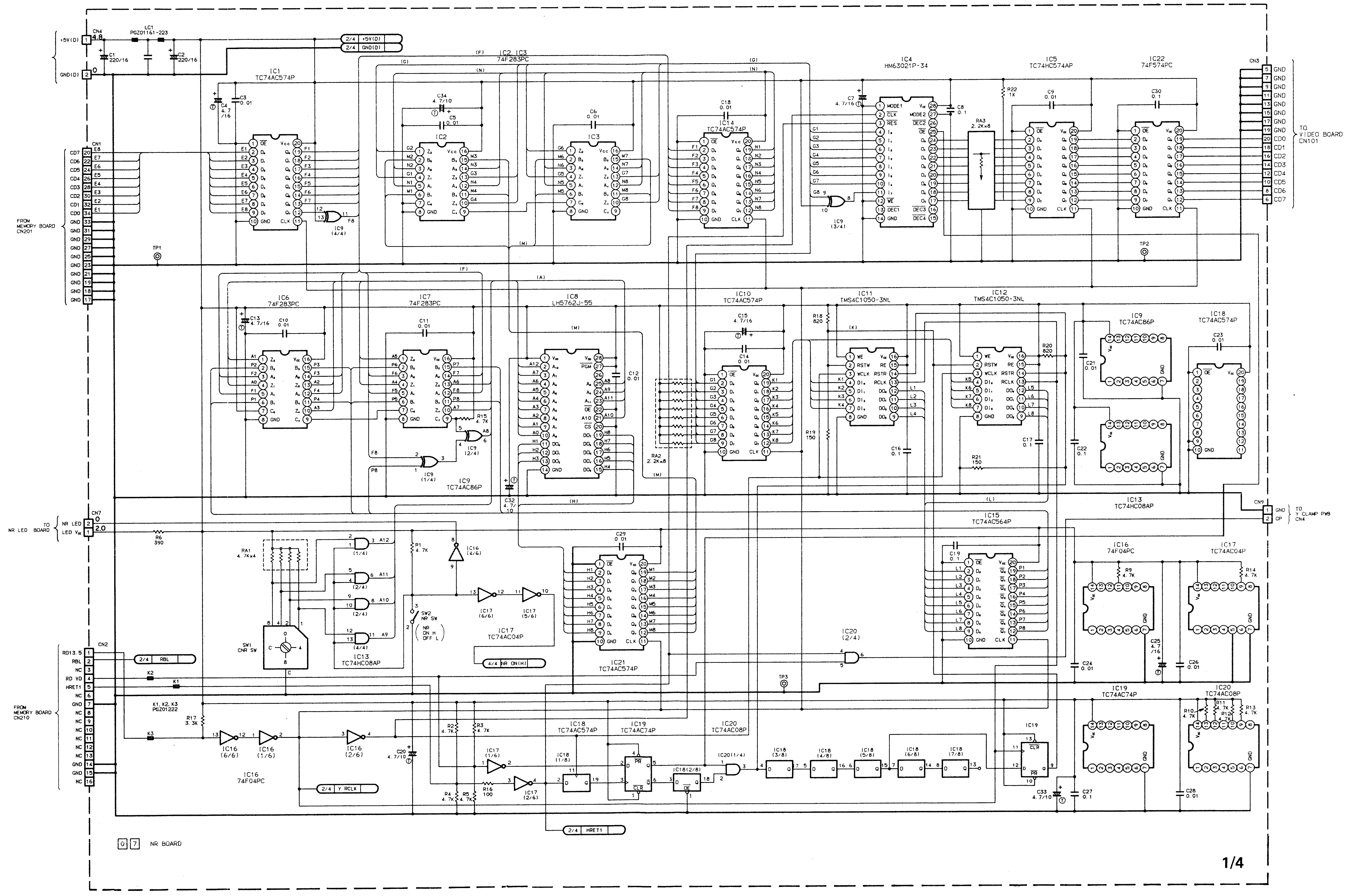
4.12 PROCESS CIRCUIT BOARD


FOR.A
PROCESSOR
A2-4361-6
MADE IN JAPAN
MDS-N1A
CN101
CN102
CN103
CN104
CN105
CN106
VIDEO IN
VIDEO OUT
Y, PB, PR OUT
S-Y OUT
SC SY IN
+12V
GND
-12V
GND
+5V
GND
DCE20-35
M5127ISP
CXD1175
MB40778
NJM2235
4053
4082
LF353
HA11247
VCXO
X-tal
V.UNITY
VIDEO LEV
CHROMA LEV
CHROMA PHASE
BLACK LEV
COLOR B/W
YC4.43 COMP
1
2
3
4
5
6
A
B
C
D
E
F
G
H

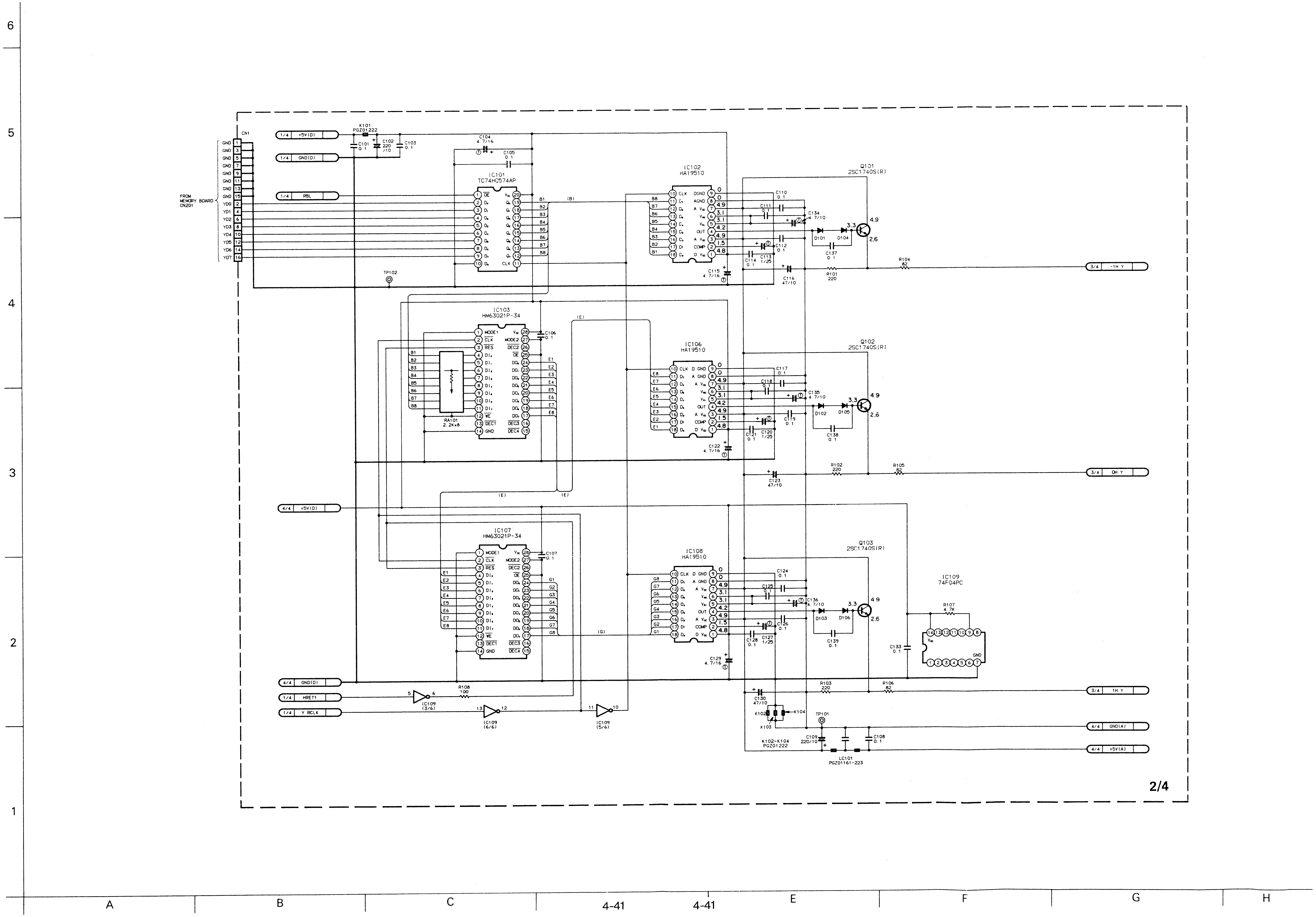
4.13 DIGITAL CIRCUIT BOARD

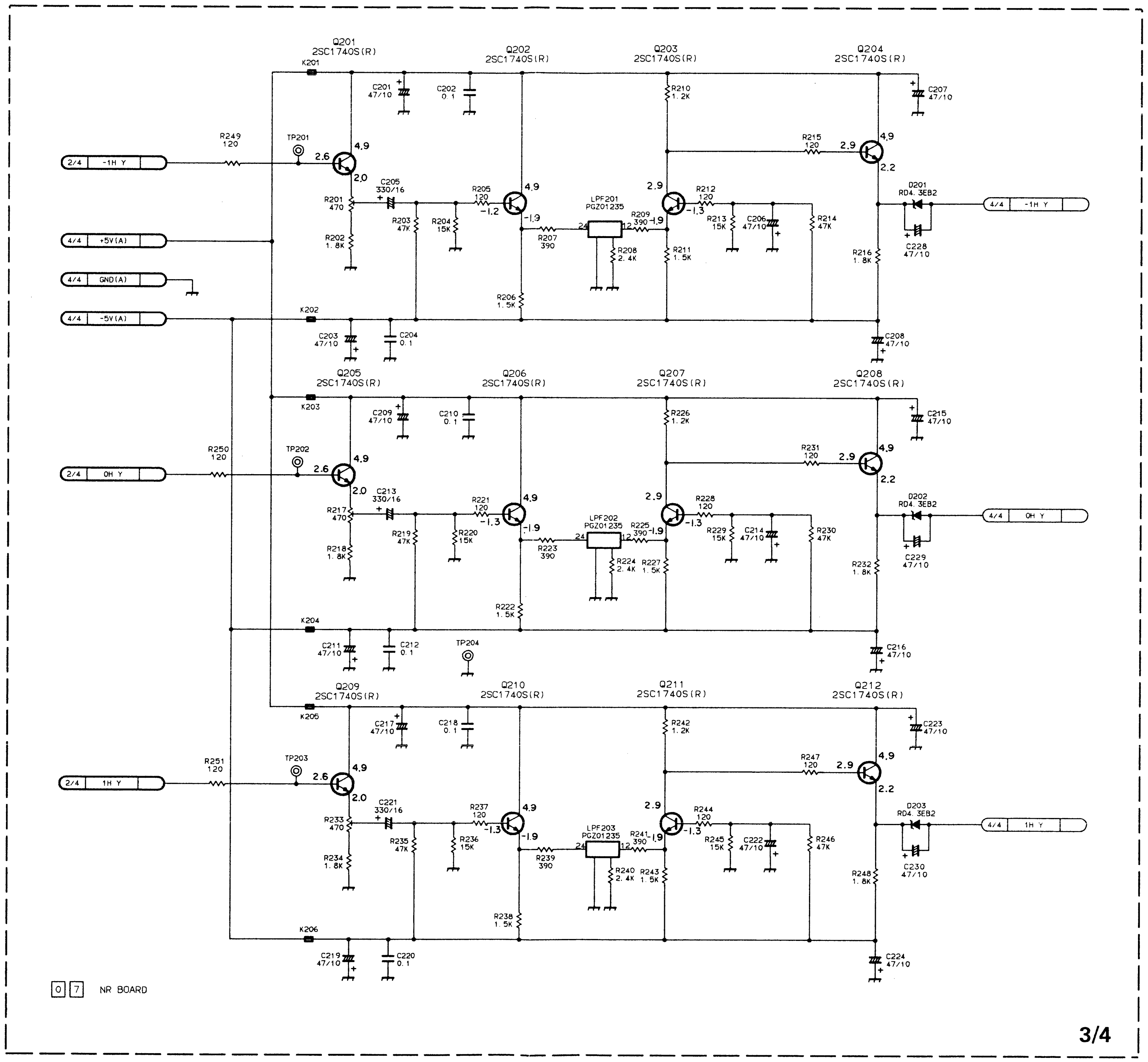

CN201
CN202
CN204
CN203
CN205
CN206
CN207
CN208
CN209
CN210
TP1 GND
TP3 GND
AUTO TIME
SW7 AUTO
LED4
SW6
FRAME FREEZE
LED3
SW5
FIELD FREEZE
LED2
SW4 BYPASS
LED1
SW3
Y DELAY
SC DUTY
SC PHASE
H PHASE
VIDEO PHASE
DOC SENS
DOC SW
REG1 78L05
REG2 78L05
NE555
EXT
HC374
LS163
CXK1202
CX7930A
CXK1206
SM5020
27S21A
MC4044
HC244
LF353
LM311
TLP570
VD WIDTH
VITS BLK
NOR FRZ
BFADJ
BALANCE
QUAD
DC OFFSET
+5V -12V +12V
A B C D E F H J K L M N
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
FOR.A DIGITAL CARD A2-4371-5
MADE IN JAPAN
6
5
4
3
2
1
A
B
C
D
E
F
G
H

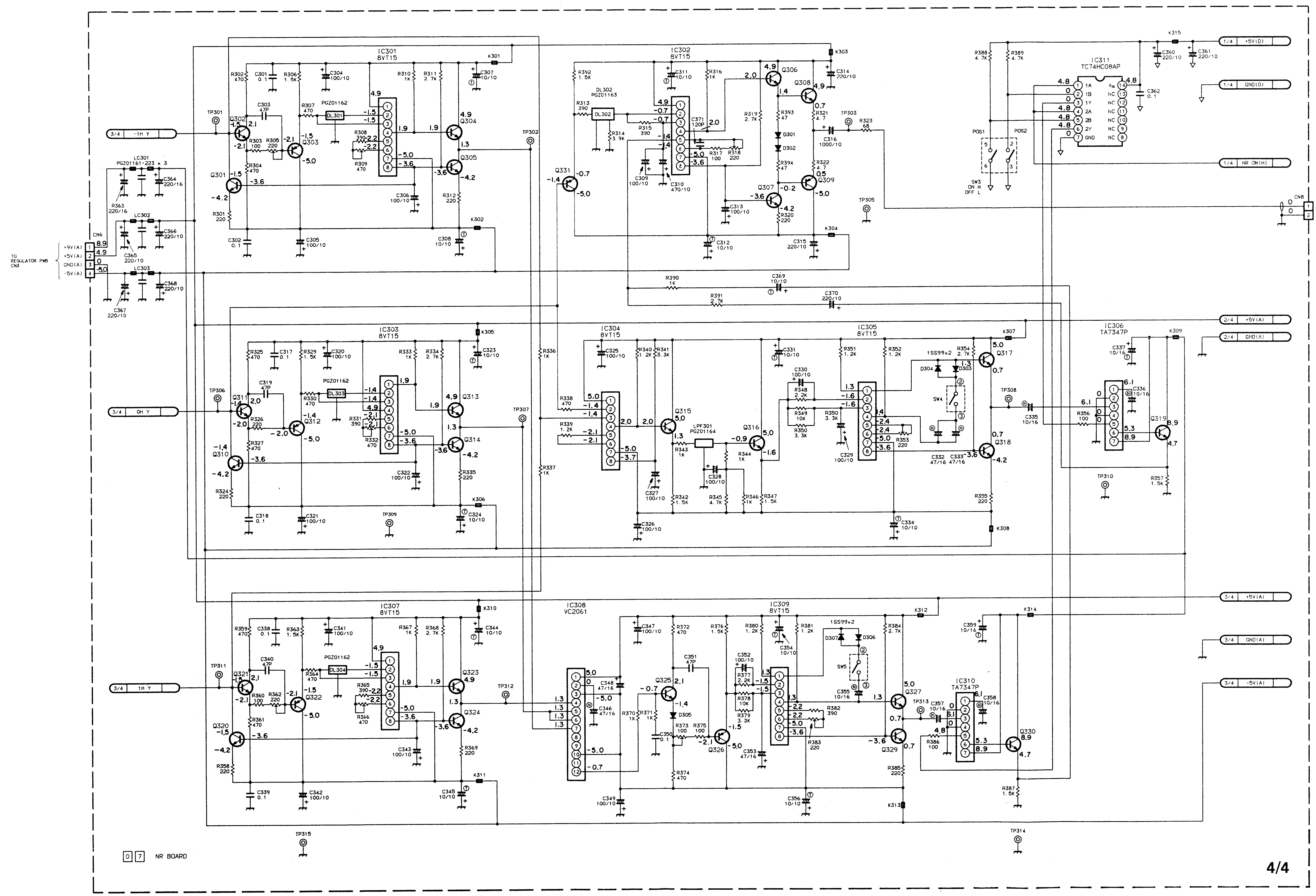
4.14 NOISE REDUCER SCHEMATIC DIAGRAM



+5V(D)
GND(D)
CN4
LC1 PGZ01161-223
C1 220/16
C2 220/16
2/4 +5V(D)
2/4 GND(D)
IC1 TC74AC574P
IC2 IC3 74F283PC
IC2
IC3
C34 4.7/10
C5 0.01
C6 0.01
C3 0.01
C4 4.7/16
IC14 TC74AC574P
C18 0.01
IC4 HM63021P-34
C7 4.7/16
C8 0.1
RA3 2.2K×8
R22 1K
IC5 TC74HC574AP
C9 0.01
IC22 74F574PC
C30 0.1
CN3
TO VIDEO BOARD CN101
CN1
FROM MEMORY BOARD CN201
CD7 CD6 CD5 CD4 CD3 CD2 CD1 CD0
TP1
TP2
IC9 (4/4)
IC9 (3/4)
IC6 74F283PC
C13 4.7/16
C10 0.01
IC7 74F283PC
C11 0.01
R15 4.7K
IC9 (2/4)
IC9 (1/4)
IC9 TC74AC86P
IC8 LH5762J-55
C12 0.01
C32 4.7/10
RA2 2.2K×8
IC10 TC74AC574P
C15 4.7/16
C14 0.01
IC11 TMS4C1050-3NL
R18 820
R19 150
C16 0.1
IC12 TMS4C1050-3NL
R20 820
R21 150
C17 0.1
IC9 TC74AC86P
C21 0.01
C22 0.1
IC18 TC74AC574P
C23 0.01
IC13 TC74HC08AP
CN9
GND
CP
TO Y CLAMP PWB CN4
CN7
NR LED
LED Vcc
TO NR LED BOARD
R6 390
RA1 4.7K×4
SW1 CNR SW
IC13 (1/4) (2/4) (3/4) (4/4)
IC13 TC74HC08AP
A12 A11 A10 A9
R1 4.7K
IC16 (4/6)
SW2 NR SW
NR ON H, OFF L
IC17 (6/6)
IC17 (5/6)
IC17 TC74AC04P
4/4 NR ON(H)
C29 0.01
IC21 TC74AC574P
IC15 TC74AC564P
C19 0.1
IC16 74F04PC
R9 4.7K
IC17 TC74AC04P
R14 4.7K
C25 4.7/16
C24 0.01
C26 0.01
IC20 (2/4)
TP3
CN2
FROM MEMORY BOARD CN210
RD13.5 RBL NC RD VD HRET1 NC GND NC NC NC NC NC NC GND GND NC
2/4 RBL
K2
K1
K1, K2, K3 PGZ01222
K3
R17 3.3K
IC16 (6/6)
IC16 (1/6)
IC16 (2/6)
IC16 74F04PC
C20 4.7/10
2/4 Y RCLK
R2 4.7K
R3 4.7K
R4 4.7K
R5 4.7K
R16 100
IC17 (1/6)
IC17 (2/6)
IC18 TC74AC574P
IC18 (1/8)
IC19 TC74AC74P
IC18 (2/8)
IC20 TC74AC08P
IC20 (1/4)
IC18 (3/8) (4/8) (5/8) (6/8) (7/8)
IC19
C33 4.7/10
C27 0.1
IC19 TC74AC74P
IC20 TC74AC08P
R10 4.7K
R11 4.7K
R12 4.7K
R13 4.7K
C28 0.01
2/4 HRET1
0 7 NR BOARD
1/4


6
5
4
3
2
1
A
B
C
E
F
G
H
2/4
FROM MEMORY BOARD CN201
CN1
GND 1
GND 3
GND 5
GND 7
GND 9
GND 11
GND 13
GND 15
YD0 2
YD1 4
YD2 6
YD3 8
YD4 10
YD5 12
YD6 14
YD7 16
1/4 +5V(D)
1/4 GND(D)
1/4 RBL
K101 PGZ01222
C101 0.1
C102 220/10
C103 0.1
C104 4.7/16
C105 0.1
IC101 TC74HC574AP
TP102
(B)
B1
B2
B3
B4
B5
B6
B7
B8
IC102 HA19510
C110 0.1
C111 0.1
C112 0.1
C113 1/25
C114 0.1
C115 4.7/16
C116 47/10
C134 4.7/10
C137 0.1
D101
D104
Q101 2SC1740S(R)
R101 220
R104 82
3/4 -1H Y
IC103 HM63021P-34
C106 0.1
RA101 2.2K×8
(E)
E1
E2
E3
E4
E5
E6
E7
E8
IC106 HA19510
C117 0.1
C118 0.1
C119 0.1
C120 1/25
C121 0.1
C122 4.7/16
C123 47/10
C135 4.7/10
C138 0.1
D102
D105
Q102 2SC1740S(R)
R102 220
R105 82
3/4 0H Y
4/4 +5V(D)
IC107 HM63021P-34
C107 0.1
(G)
G1
G2
G3
G4
G5
G6
G7
G8
IC108 HA19510
C124 0.1
C125 0.1
C126 0.1
C127 1/25
C128 0.1
C129 4.7/16
C130 47/10
C136 4.7/10
C139 0.1
D103
D106
Q103 2SC1740S(R)
R103 220
R106 82
3/4 1H Y
IC109 74F04PC
R107 4.7K
C133 0.1
4/4 GND(D)
1/4 HRET1
1/4 Y RCLK
R108 100
IC109 (3/6)
IC109 (6/6)
IC109 (5/6)
K102
K103
K104
K102~K104 PGZ01222
TP101
C108 0.1
C109 220/10
LC101 PGZ01161-223
4/4 GND(A)
4/4 +5V(A)
0
0
4.9
3.1
3.1
4.2
4.9
1.5
4.8
3.3
4.9
2.6

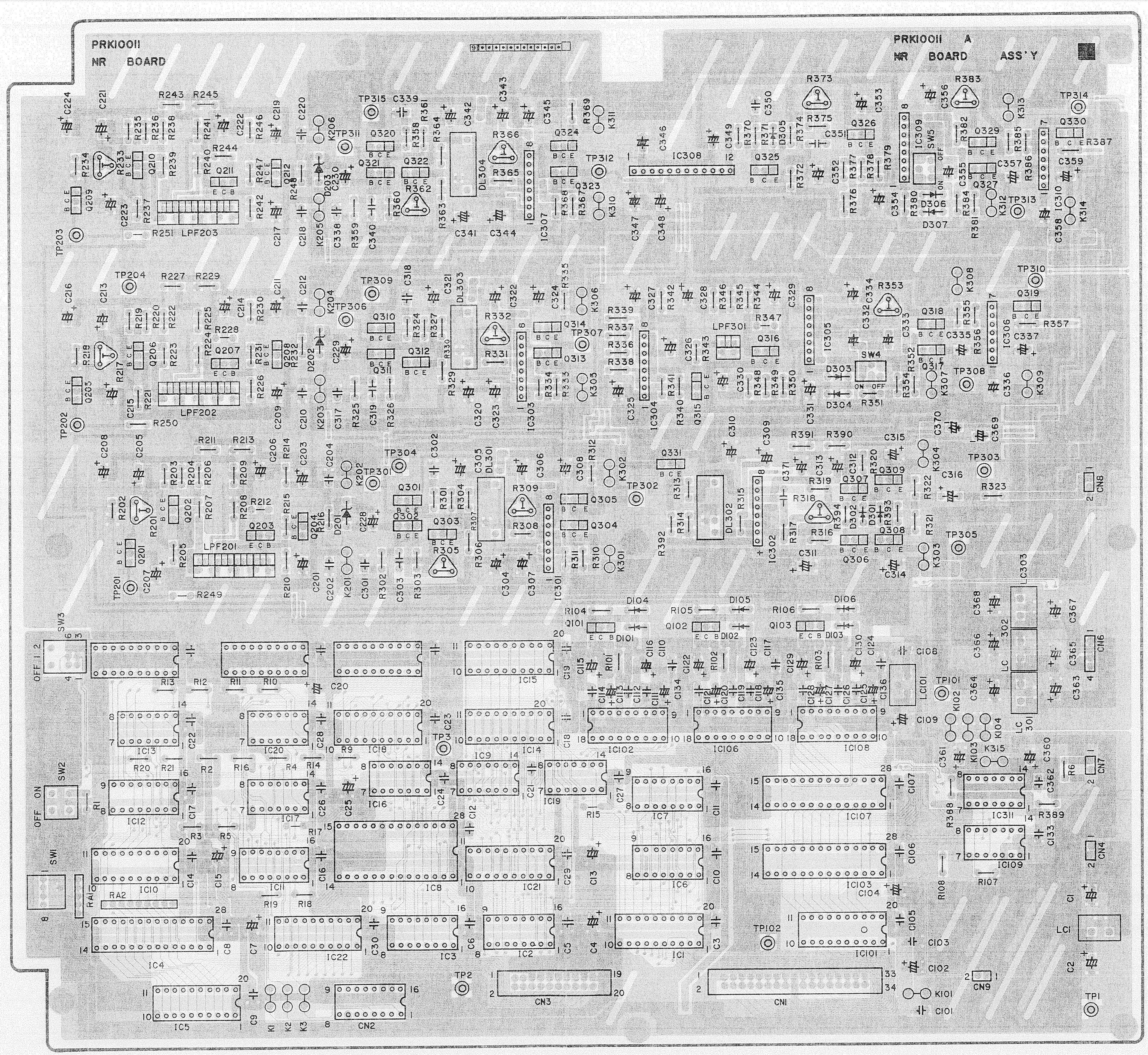

Q201
2SC1740S(R)
Q202
2SC1740S(R)
Q203
2SC1740S(R)
Q204
2SC1740S(R)
K201
C201
47/10
C202
0.1
R210
1.2K
C207
47/10
R249
120
TP201
2/4
-1H Y
2.6
4.9
2.0
R215
120
2.9
4.9
2.2
C205
330/16
R201
470
R205
120
-1.2
4.9
-1.9
LPF201
PGZ01235
24
12
R209
390
-1.9
2.9
-1.3
R212
120
D201
RD4.3EB2
4/4
-1H Y
4/4
+5V(A)
R202
1.8K
R203
47K
R204
15K
R207
390
R208
2.4K
R211
1.5K
R213
15K
C206
47/10
R214
47K
R216
1.8K
C228
47/10
4/4
GND(A)
4/4
-5V(A)
R206
1.5K
K202
C203
47/10
C204
0.1
C208
47/10
Q205
2SC1740S(R)
Q206
2SC1740S(R)
Q207
2SC1740S(R)
Q208
2SC1740S(R)
K203
C209
47/10
C210
0.1
R226
1.2K
C215
47/10
R250
120
TP202
2/4
0H Y
2.6
4.9
2.0
R231
120
2.9
4.9
2.2
C213
330/16
R217
470
R221
120
-1.3
4.9
-1.9
LPF202
PGZ01235
24
12
R225
390
-1.9
2.9
-1.3
R228
120
D202
RD4.3EB2
4/4
0H Y
R218
1.8K
R219
47K
R220
15K
R223
390
R224
2.4K
R227
1.5K
R229
15K
C214
47/10
R230
47K
R232
1.8K
C229
47/10
R222
1.5K
K204
C211
47/10
C212
0.1
TP204
C216
47/10
Q209
2SC1740S(R)
Q210
2SC1740S(R)
Q211
2SC1740S(R)
Q212
2SC1740S(R)
K205
C217
47/10
C218
0.1
R242
1.2K
C223
47/10
R251
120
TP203
2/4
1H Y
2.6
4.9
2.0
R247
120
2.9
4.9
2.2
C221
330/16
R233
470
R237
120
-1.3
4.9
-1.9
LPF203
PGZ01235
24
12
R241
390
-1.9
2.9
-1.3
R244
120
D203
RD4.3EB2
4/4
1H Y
R234
1.8K
R235
47K
R236
15K
R239
390
R240
2.4K
R243
1.5K
R245
15K
C222
47/10
R246
47K
R248
1.8K
C230
47/10
R238
1.5K
K206
C219
47/10
C220
0.1
C224
47/10
0 7 NR BOARD
3/4
6
5
4
3
2
1
A
B
C
E
F
G
H



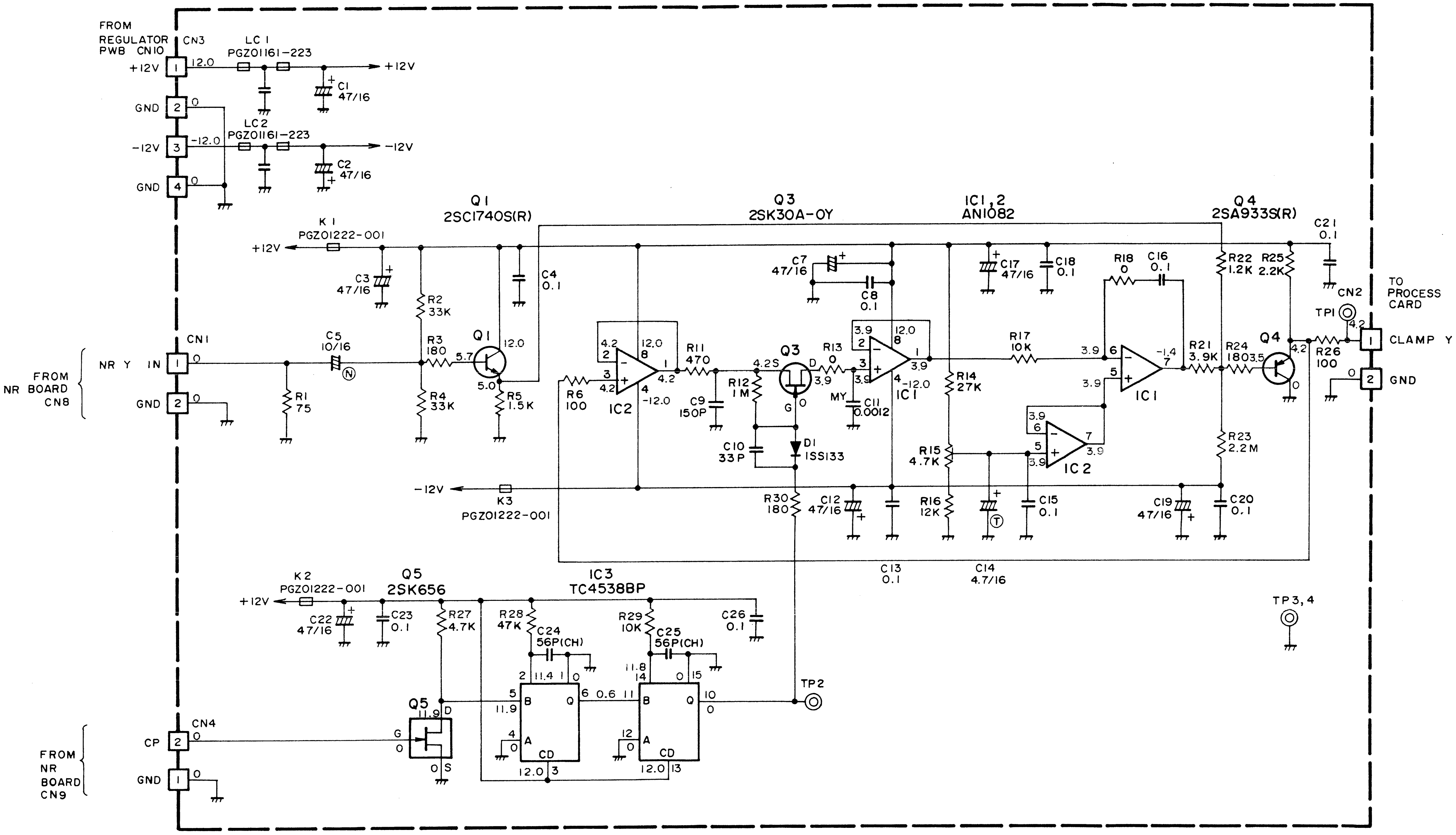
IC301 8VT15
IC302 8VT15
IC303 8VT15
IC304 8VT15
IC305 8VT15
IC306 TA7347P
IC307 8VT15
IC308 VC2061
IC309 8VT15
IC310 TA7347P
IC311 TC74HC08AP
DL301 PGZ01162
DL302 PGZ01163
DL303 PGZ01162
DL304 PGZ01162
LPF301 PGZ01164
LC301 PGZ01161-223 × 3
LC302
LC303
1SS99×2
SW3 ON H OFF L
SW4
SW5
POS1
POS2
CN6
+9V(A)
+5V(A)
GND(A)
-5V(A)
TO REGULATOR PWB CN3
CN8
Y
GND
TO Y CLAMP PWB CN1
3/4 -1H Y
3/4 0H Y
3/4 1H Y
1/4 +5V(D)
1/4 GND(D)
1/4 NR ON(H)
2/4 +5V(A)
2/4 GND(A)
3/4 +5V(A)
3/4 GND(A)
3/4 -5V(A)
TP301
TP302
TP303
TP305
TP306
TP307
TP308
TP309
TP310
TP311
TP312
TP313
TP314
TP315
07 NR BOARD
4/4

6
5
4
3
2
1
A
B
C
E
F
G
H

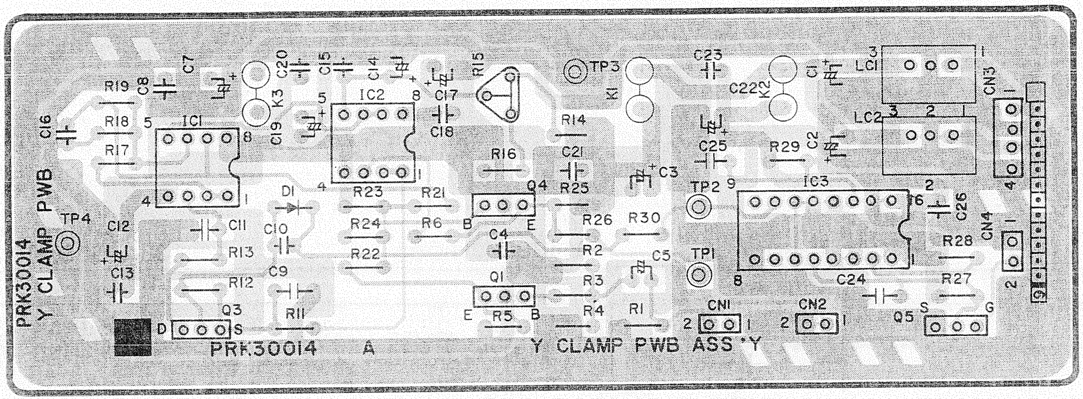
4.15 NOISE REDUCER CIRCUIT BOARD


PRK10011
NR BOARD
PRK10011 A
NR BOARD ASS'Y

4.16 Y CLAMP SCHEMATIC DIAGRAM


FROM REGULATOR PWB CN10
CN3
+12V
GND
-12V
GND
12.0
-12.0
LC1 PGZ01161-223
LC2 PGZ01161-223
C1 47/16
C2 47/16
+12V
-12V
Q1 2SC1740S(R)
Q3 2SK30A-OY
IC1, 2 AN1082
Q4 2SA933S(R)
K1 PGZ01222-001
K2 PGZ01222-001
K3 PGZ01222-001
C3 47/16
C4 0.1
C5 10/16
C6
C7 47/16
C8 0.1
C9 150P
C10 33P
C11 0.0012
MY
C12 47/16
C13 0.1
C14 4.7/16
C15 0.1
C16 0.1
C17 47/16
C18 0.1
C19 47/16
C20 0.1
C21 0.1
C22 47/16
C23 0.1
C24 56P(CH)
C25 56P(CH)
C26 0.1
R1 75
R2 33K
R3 180
R4 33K
R5 1.5K
R6 100
R11 470
R12 1M
R13 0
R14 27K
R15 4.7K
R16 12K
R17 10K
R18 0
R21 3.9K
R22 1.2K
R23 2.2M
R24 180
R25 2.2K
R26 100
R27 4.7K
R28 47K
R29 10K
R30 180
D1 1SS133
IC1
IC2
Q5 2SK656
IC3 TC4538BP
FROM NR BOARD CN8
NR Y IN
CN1
GND
FROM NR BOARD CN9
CN4
CP
TO PROCESS CARD
CN2
CLAMP Y
TP1
TP2
TP3, 4
N
T
G
D
S
B
Q
A
CD

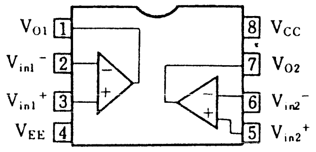
4.17 Y CLAMP CIRCUIT BOARD


PRK30014
Y CLAMP PWB
TP4
C12
C13
C16
R19
R18
R17
C8
C7
IC1
5
8
4
1
R13
R12
Q3
D
S
C11
C10
C9
R11
K3
C19
C20
C15
C14
IC2
C17
C18
D1
R23
R24
R22
R21
R6
R15
Q4
B
E
C4
Q1
R5
R14
R16
C21
R25
R26
R2
R3
R4
C3
R30
C5
R1
TP3
K1
TP2
TP1
C23
C22
K2
C25
C1
R29
C2
IC3
9
16
C24
CN1
CN2
LC1
LC2
3
2
CN3
C26
R28
R27
CN4
Q5
G
PRK30014
A
Y CLAMP PWB ASS'Y

4.18 IC BLOCK DIAGRAM

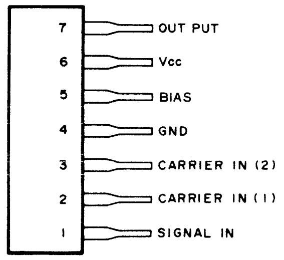
– AN1082 –

J-FET Input Operational Amplifiers


V_{O1} 1
V_{in1}^- 2
V_{in1}^+ 3
V_{EE} 4
8 V_{CC}
7 V_{O2}
6 V_{in2}^-
5 V_{in2}^+

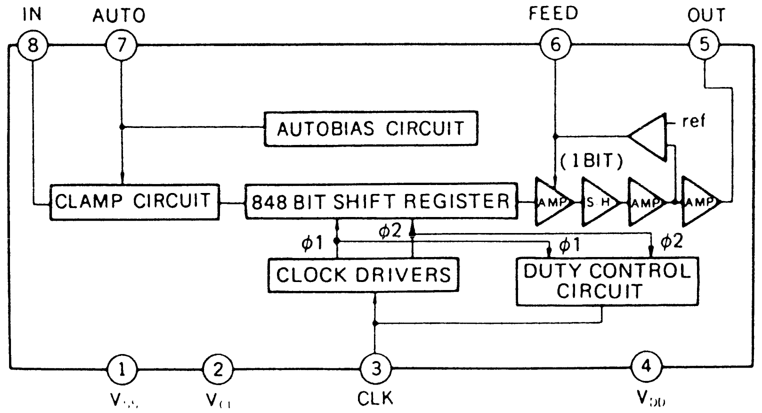
– AN612 –

Balance Modulator Circuit


7 OUT PUT
6 Vcc
5 BIAS
4 GND
3 CARRIER IN (2)
2 CARRIER IN (1)
1 SIGNAL IN

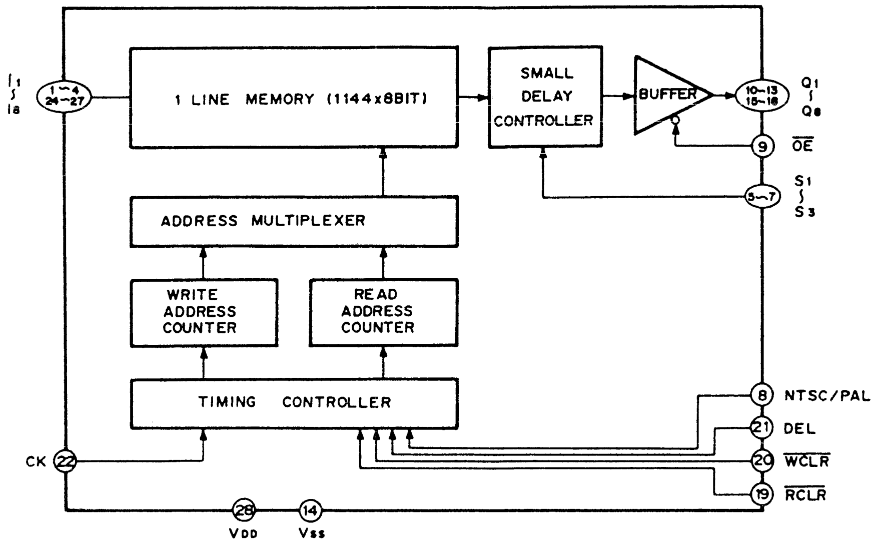
– CXL5003 –

CMOS-CCD 1H Delay Line


IN 8
AUTO 7
FEED 6
OUT 5
AUTOBIAS CIRCUIT
ref
(1BIT)
CLAMP CIRCUIT
848 BIT SHIFT REGISTER
AMP
S H
AMP
AMP
ϕ1
ϕ2
ϕ1
ϕ2
CLOCK DRIVERS
DUTY CONTROL CIRCUIT
1
2
3
4
CLK

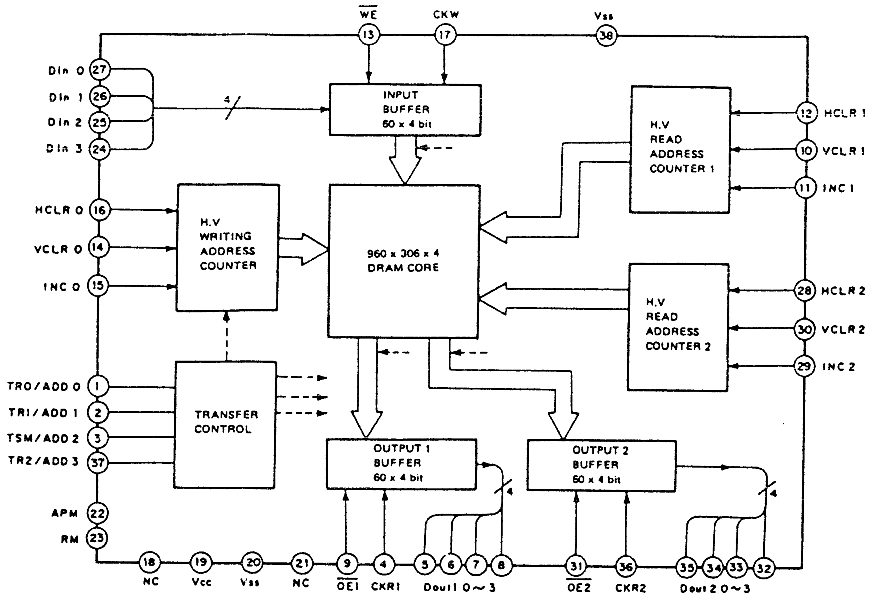
– CXK1202S –

Digital Delay Line


I1 ~ I8
1~4 24~27
1 LINE MEMORY (1144x8BIT)
SMALL DELAY CONTROLLER
BUFFER
10~13 15~18
Q1 ~ Q8
9 OE
5~7
S1 ~ S3
ADDRESS MULTIPLEXER
WRITE ADDRESS COUNTER
READ ADDRESS COUNTER
TIMING CONTROLLER
CK 22
8 NTSC/PAL
21 DEL
20 WCLR
19 RCLR
28 VDD
14 Vss

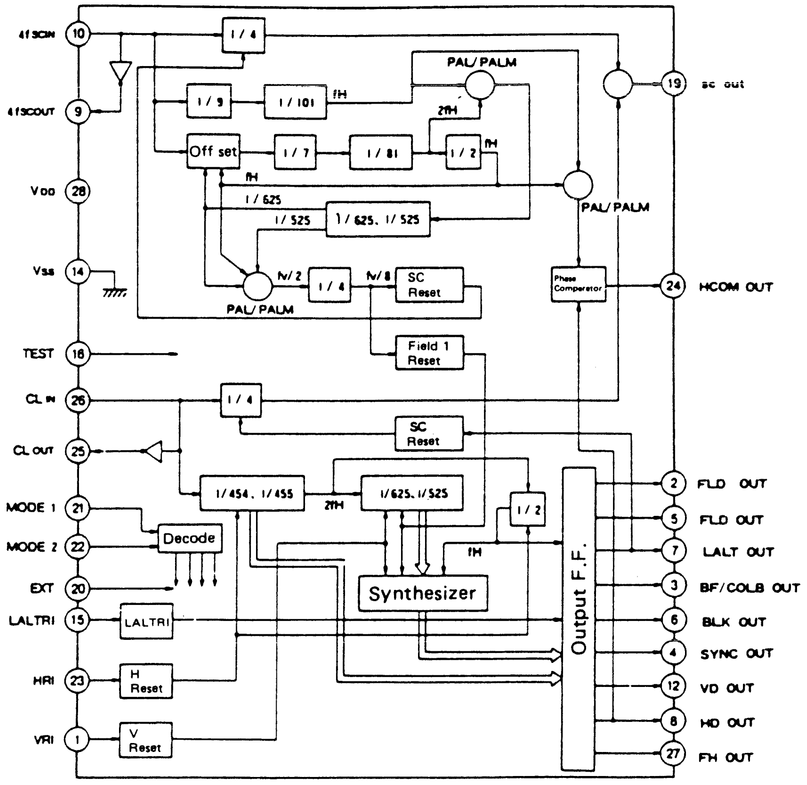
– CXK1206M –

Field Memory


WE 13
CKW 17
Vss 38
Din 0 27
Din 1 26
Din 2 25
Din 3 24
4
INPUT BUFFER 60 x 4 bit
H.V READ ADDRESS COUNTER 1
12 HCLR 1
10 VCLR 1
11 INC 1
HCLR 0 16
VCLR 0 14
INC 0 15
H.V WRITING ADDRESS COUNTER
960 x 306 x 4 DRAM CORE
H.V READ ADDRESS COUNTER 2
28 HCLR 2
30 VCLR 2
29 INC 2
TR0/ADD 0 1
TR1/ADD 1 2
TSM/ADD 2 3
TR2/ADD 3 37
TRANSFER CONTROL
OUTPUT 1 BUFFER 60 x 4 bit
OUTPUT 2 BUFFER 60 x 4 bit
APM 22
RM 23
18 NC
19 Vcc
20 Vss
21 NC
9 OE1
4 CKR1
5 6 7 8 Dout1 0~3
31 OE2
36 CKR2
35 34 33 32 Dout2 0~3

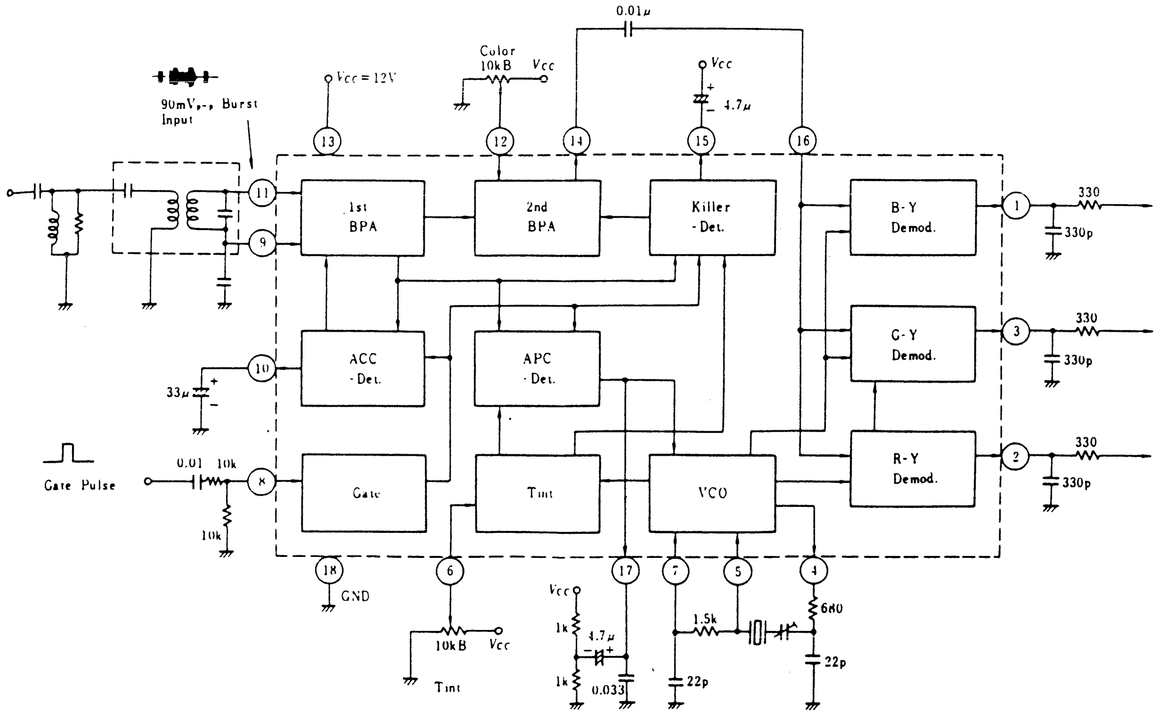
– CX7930A –

Sync Generator


4fSCIN 10
4fSCOUT 9
VDD 28
Vss 14
TEST 16
CL IN 26
CL OUT 25
MODE 1 21
MODE 2 22
EXT 20
LALTRI 15
HRI 23
VRI 1
1/4
PAL/PALM
1/9
1/101
fH
2fH
Off set
1/7
1/81
1/2
1/625
1/525
1/625, 1/525
fV/2
1/4
fV/8
SC Reset
PAL/PALM
Phase Comparator
Field 1 Reset
1/4
SC Reset
1/454, 1/455
1/625, 1/525
1/2
Decode
Synthesizer
LALTRI
H Reset
V Reset
Output F.F.
19 sc out
24 HCOM OUT
2 FLD OUT
5 FLD OUT
7 LALT OUT
3 BF/COLB OUT
6 BLK OUT
4 SYNC OUT
12 VD OUT
8 HD OUT
27 FH OUT

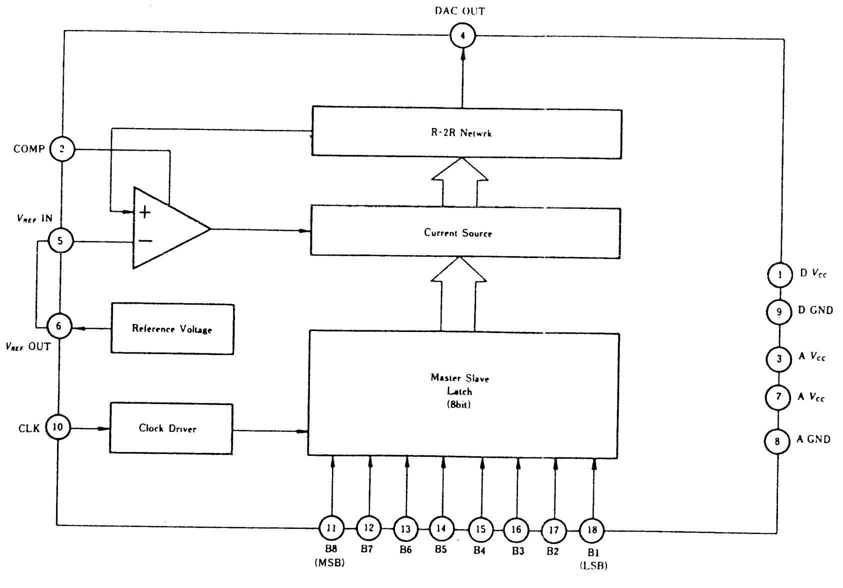
– HA11247 –

NTSC Color TV Chroma Processor


0.01μ
Color 10kB Vcc
Vcc
4.7μ
Vcc = 12V
90mVp-p Burst Input
13
12
14
15
16
11
9
1st BPA
2nd BPA
Killer -Det.
B-Y Demod.
G-Y Demod.
R-Y Demod.
1
3
2
330
330p
10
33μ
ACC -Det.
APC -Det.
Gate Pulse
0.01 10k
10k
8
Gate
Tint
VCO
18 GND
6
17
7
5
4
Vcc
10kB Vcc
Tint
1k
4.7μ
1k
0.033
1.5k
22p
680
22p

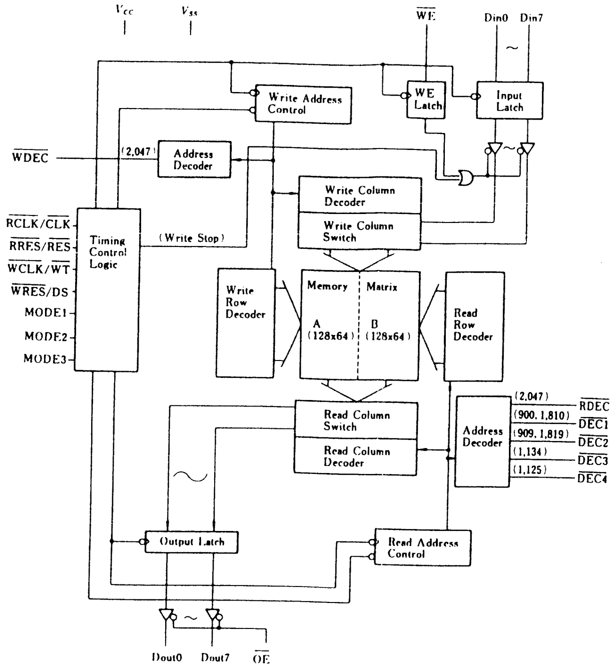
– HA19510 –

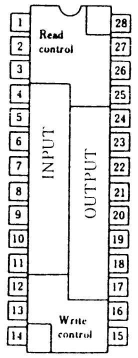
D/A Converter


DAC OUT
COMP
V_REF IN
V_REF OUT
CLK
R-2R Netwrk
Current Source
Reference Voltage
Master Slave Latch (8bit)
Clock Driver
D Vcc
D GND
A Vcc
A Vcc
A GND
B8 (MSB)
B7
B6
B5
B4
B3
B2
B1 (LSB)

– HM63021 –

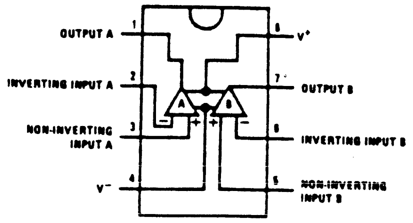
2048 word x 8-bit Line Memory


Vcc
Vss
WE
Din0
Din7
Write Address Control
WE Latch
Input Latch
WDEC
Address Decoder
Write Column Decoder
Write Column Switch
RCLK/CLK
RRES/RES
WCLK/WT
WRES/DS
MODE1
MODE2
MODE3
Timing Control Logic
(Write Stop)
Write Row Decoder
Memory Matrix
A (128x64)
B (128x64)
Read Row Decoder
Read Column Switch
Read Column Decoder
Address Decoder
RDEC
DEC1
DEC2
DEC3
DEC4
Output Latch
Read Address Control
Dout0
Dout7
OE


Read control
INPUT
OUTPUT
Write control

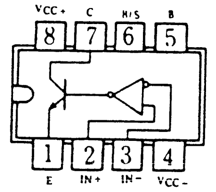
– LF353 –

J-FET Input Operational Amplifiers


OUTPUT A
INVERTING INPUT A
NON-INVERTING INPUT A
V⁻
V⁺
OUTPUT B
INVERTING INPUT B
NON-INVERTING INPUT B

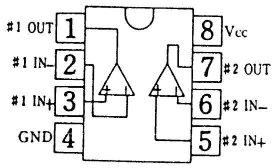
– LM311 –

Voltage Comparator


VCC+
C
R/S
B
E
IN+
IN−
VCC−

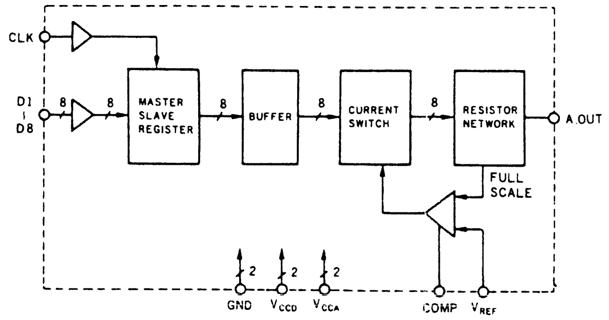
– LM393 –

Comparators


#1 OUT
#1 IN−
#1 IN+
GND
Vcc
#2 OUT
#2 IN−
#2 IN+

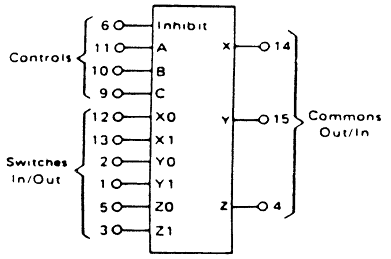
– MB40778 –

8-bit D/A Converter


CLK
D1
D8
MASTER SLAVE REGISTER
BUFFER
CURRENT SWITCH
RESISTOR NETWORK
A.OUT
FULL SCALE
GND
V_CCD
V_CCA
COMP
V_REF

– MC14053B/CD4053B –

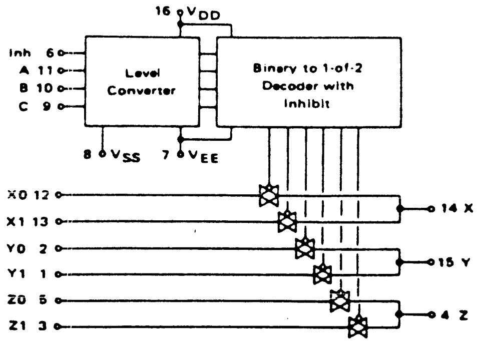
Analog Multiplexer/Demultiplexer


Controls
Inhibit
A
B
C
Switches In/Out
X0
X1
Y0
Y1
Z0
Z1
Commons Out/In

V_{DD} = Pin 16

V_{SS} = Pin 8

V_{EE} = Pin 7

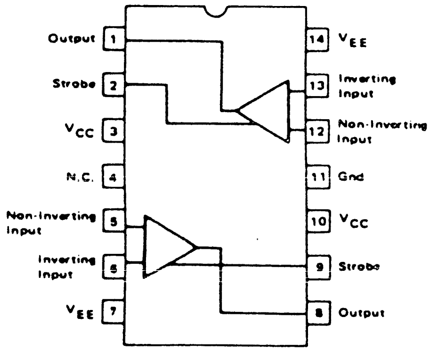

16 VDD
Inh 6
A 11
B 10
C 9
Level Converter
Binary to 1-of-2 Decoder with Inhibit
8 VSS
7 VEE
X0 12
X1 13
Y0 2
Y1 1
Z0 5
Z1 3
14 X
15 Y
4 Z

TRUTH TABLE

Control Inputs				ON Switches		
	Select					
Inhibit	C*	B	A	MC14053B		
0	0	0	0	Z0	Y0	X0
0	0	0	1	Z0	Y0	X1
0	0	1	0	Z0	Y1	X0
0	0	1	1	Z0	Y1	X1
0	1	0	0	Z1	Y0	X0
0	1	0	1	Z1	Y0	X1
0	1	1	0	Z1	Y1	X0
0	1	1	1	Z1	Y1	X1
1	x	x	x	None		

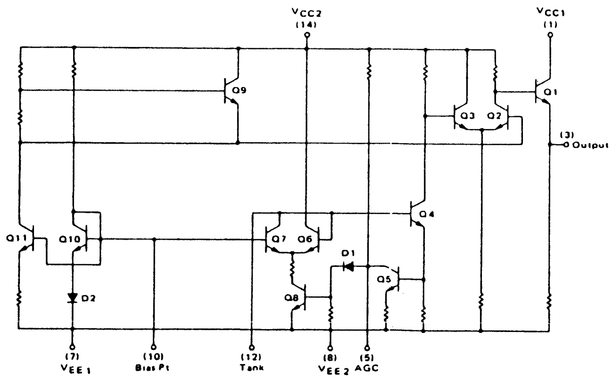
– MC1414 –

Differential Comparators


Output
Strobe
Vcc
N.C.
Non-Inverting Input
Inverting Input
VEE
VEE
Inverting Input
Non-Inverting Input
Gnd
Vcc
Strobe
Output

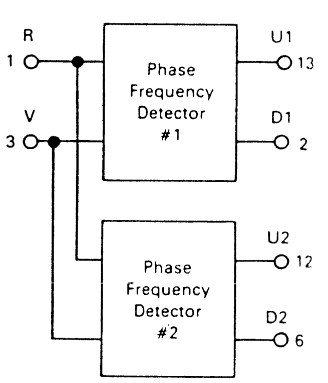
– MC1648 –

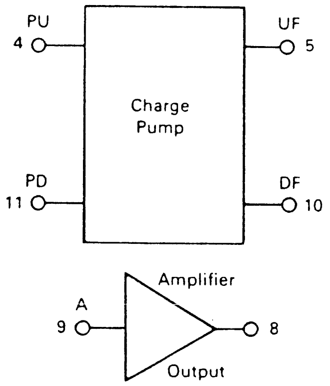
Voltage-Controlled Oscillator


Vcc2 (14)
Vcc1 (1)
Q9
Q3
Q2
Q1
(3) Output
Q4
Q11
Q10
Q7
Q6
D1
Q5
Q8
D2
(7) VEE1
(10) Bias Pt
(12) Tank
(8) VEE2
(5) AGC

– MC4044 –

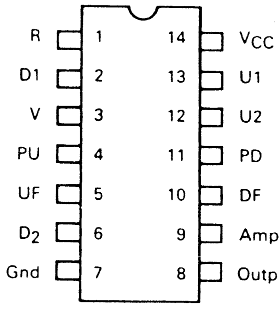
Phase-Frequency Detector


R
1
V
3
Phase Frequency Detector #1
Phase Frequency Detector #2
U1
13
D1
2
U2
12
D2
6


PU
4
PD
11
Charge Pump
UF
5
DF
10
A
9
Amplifier
8
Output

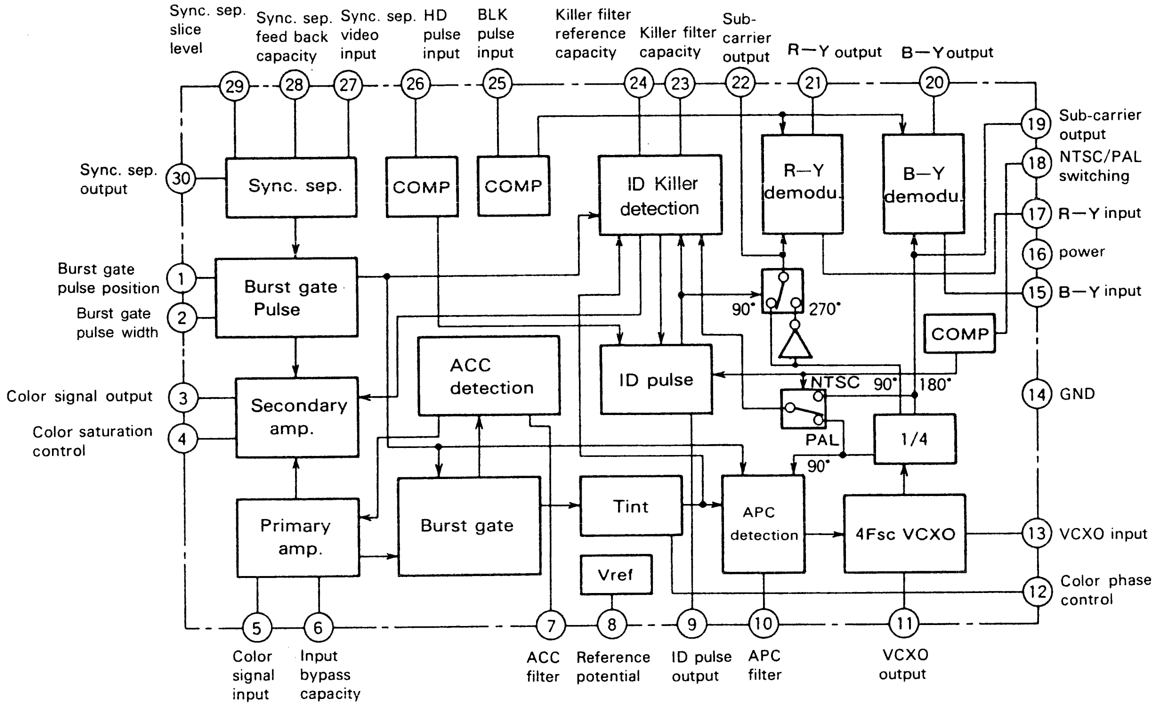
V_{CC} = Pin 14

GND = Pin 7


R
D1
V
PU
UF
D2
Gnd
VCC
U1
U2
PD
DF
Amp In
Output

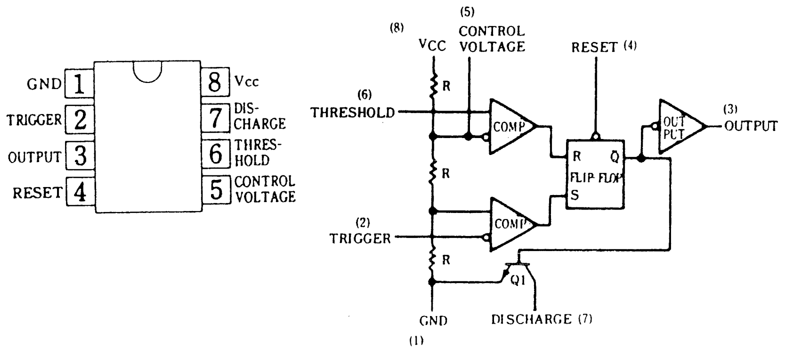
– M51271SP –

PAL Decoder


Sync. sep. slice level
Sync. sep. feed back capacity
Sync. sep. video input
HD pulse input
BLK pulse input
Killer filter reference capacity
Killer filter capacity
Sub-carrier output
R—Y output
B—Youtput
Sync. sep. output
Burst gate pulse position
Burst gate pulse width
Color signal output
Color saturation control
Sub-carrier output
NTSC/PAL switching
R—Y input
power
B—Y input
GND
VCXO input
Color phase control
Color signal input
Input bypass capacity
ACC filter
Reference potential
ID pulse output
APC filter
VCXO output
Sync. sep.
COMP
COMP
ID Killer detection
R—Y demodu.
B—Y demodu.
Burst gate Pulse
COMP
90°
270°
ACC detection
ID pulse
NTSC
90°
180°
Secondary amp.
PAL
1/4
90°
Primary amp.
Burst gate
Tint
APC detection
4Fsc VCXO
Vref

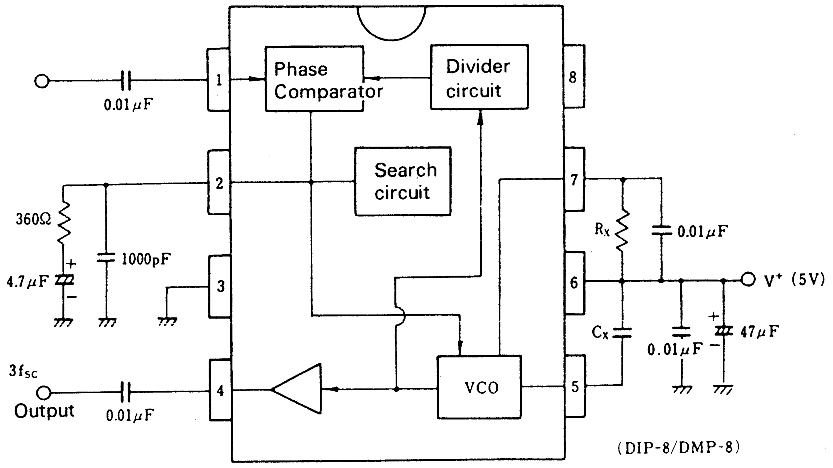
– NE555 –

Timing Circuit


GND 1
TRIGGER 2
OUTPUT 3
RESET 4
8 Vcc
7 DIS-CHARGE
6 THRES-HOLD
5 CONTROL VOLTAGE
(8) VCC
(5) CONTROL VOLTAGE
RESET (4)
(6) THRESHOLD
R
COMP
R
Q
FLIP FLOP
S
OUT PUT
(3) OUTPUT
R
(2) TRIGGER
COMP
R
Q1
GND (1)
DISCHARGE (7)

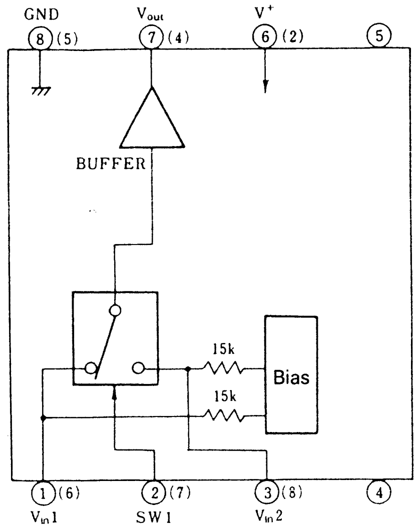
– NJM2228S –

Oscillator


0.01μF
1
Phase Comparator
Divider circuit
8
Search circuit
360Ω
1000pF
4.7μF
2
7
3
Rx
0.01μF
6
V⁺ (5V)
Cx
0.01μF
47μF
3fsc Output
0.01μF
4
VCO
5
(DIP-8/DMP-8)

– NJM2233AS –

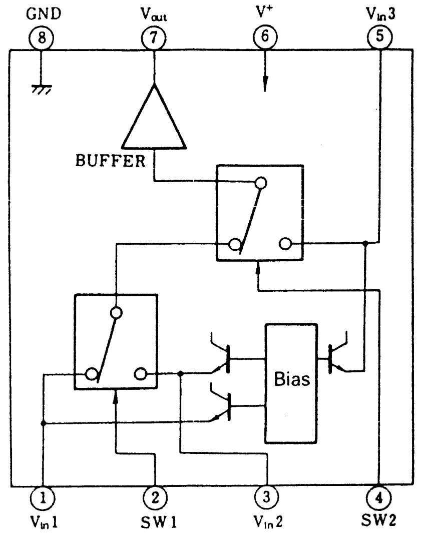
Switching Circuit


GND
⑧(5)
Vout
⑦(4)
V⁺
⑥(2)
⑤
BUFFER
15k
15k
Bias
①(6) Vin1
②(7) SW1
③(8) Vin2
④

○ DIP-8, DMP-8 (4,5pin NC)
( ) SIP-8 (1,3pin NC)

– NJM2235S –

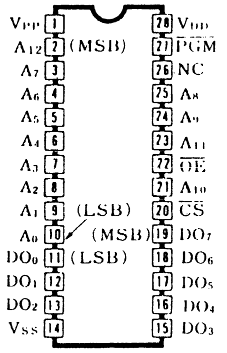
Switching Circuit


GND
⑧
Vout
⑦
V⁺
⑥
Vin3
⑤
BUFFER
Bias
① Vin1
② SW1
③ Vin2
④ SW2

– PGD30533 –

(LH5762J)

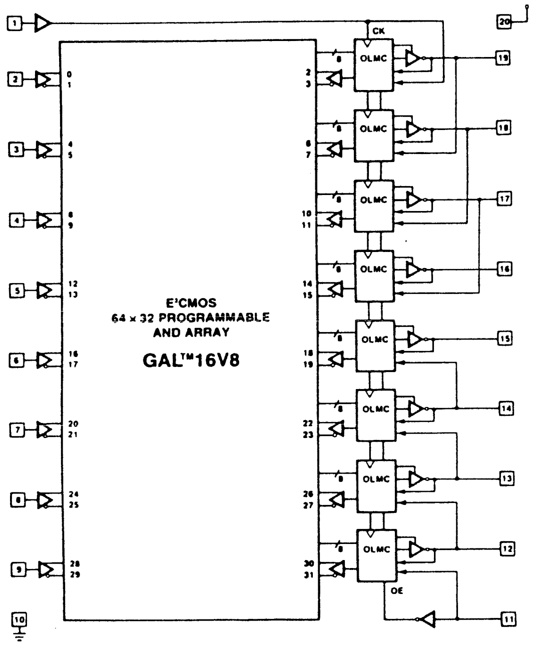
UV-EPROM


VPP 1
A12 2 (MSB)
A7 3
A6 4
A5 5
A4 6
A3 7
A2 8
A1 9 (LSB)
A0 10
DO0 11 (LSB)
DO1 12
DO2 13
VSS 14
28 VDD
27 PGM
26 NC
25 A8
24 A9
23 A11
22 OE
21 A10
20 CS
(MSB) 19 DO7
18 DO6
17 DO5
16 DO4
15 DO3

– PM2442 ~ 2461 –

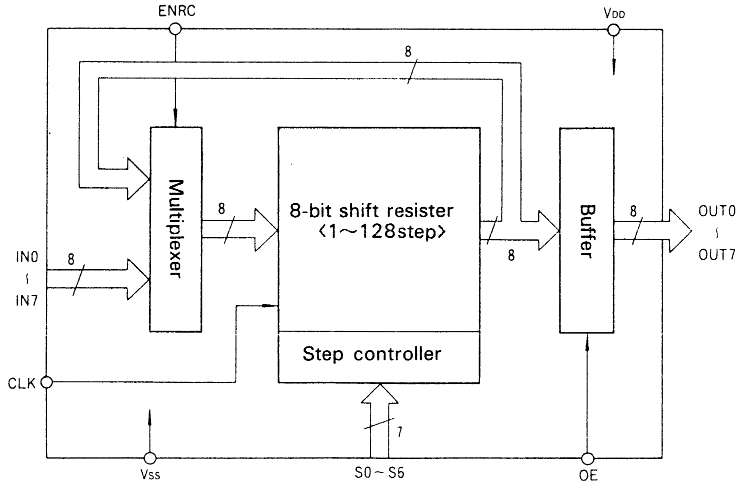
(GAL16V8)

Generic Array Logic


E²CMOS
64 x 32 PROGRAMMABLE AND ARRAY
GAL™16V8
CK
OLMC
OE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

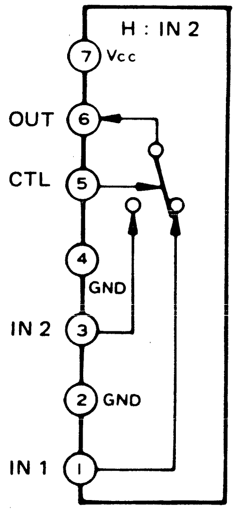
– SM5828 –

Shift Resister


ENRC
VDD
8
Multiplexer
8
8-bit shift resister ⟨1~128step⟩
8
Buffer
8
OUT0 ~ OUT7
IN0 ~ IN7
8
CLK
Step controller
7
VSS
S0~S6
OE

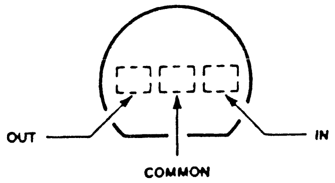
– TA7347 –

2-Input Switch


H : IN 2
7 Vcc
OUT 6
CTL 5
4 GND
IN 2 3
2 GND
IN 1 1

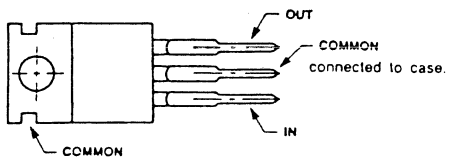
– TA78L005/009 –

Voltage Regulator


OUT
IN
COMMON

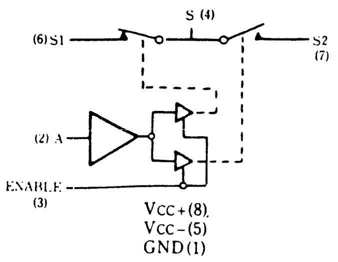
– TA78009 –

Voltage Regulator


OUT
COMMON
connected to case.
IN
COMMON

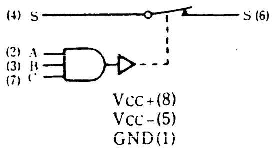
– TL607 –

P-MOS Analog Switch


S (4)
(6) S1
S2 (7)
(2) A
ENABLE (3)
Vcc+(8)
Vcc-(5)
GND(1)

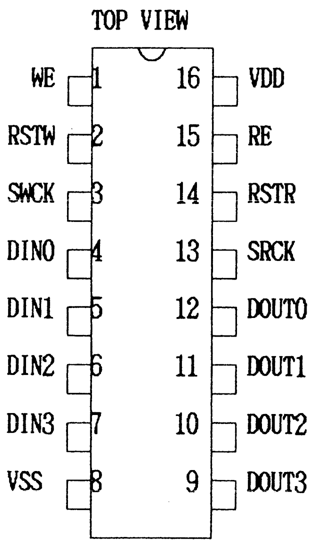
– TL610 –

P-MOS Analog Switch


(4) S
S (6)
(2) A
(3) B
(7) C
Vcc+(8)
Vcc-(5)
GND(1)

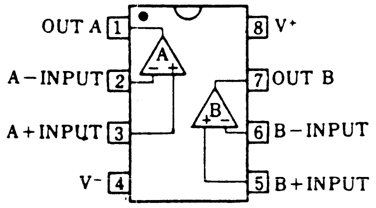
— TMS4C1050NL-3 —

263 x 4 bit Serial Memory


TOP VIEW
WE 1
RSTW 2
SWCK 3
DIN0 4
DIN1 5
DIN2 6
DIN3 7
VSS 8
16 VDD
15 RE
14 RSTR
13 SRCK
12 DOUT0
11 DOUT1
10 DOUT2
9 DOUT3

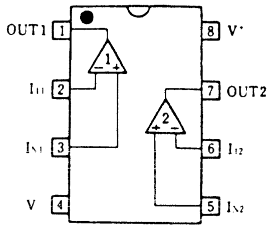
— UPC1458 —

Amplifier Circuits


OUT A 1
A−INPUT 2
A+INPUT 3
V− 4
8 V+
7 OUT B
6 B−INPUT
5 B+INPUT
A
B

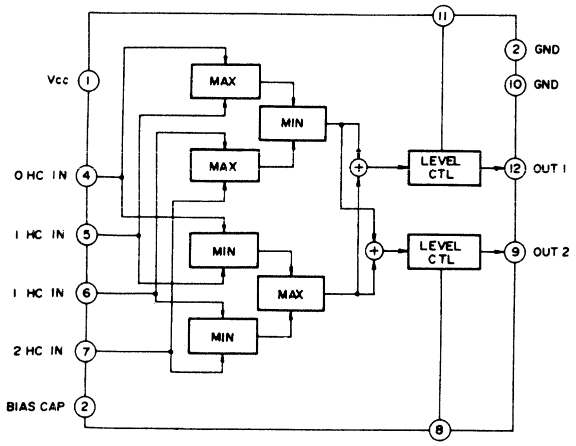
— UPC4082 —

J-FET Input Operational Amplifier Circuits


OUT1 1
2
3
V 4
8 V+
7 OUT2
6
5
1
2

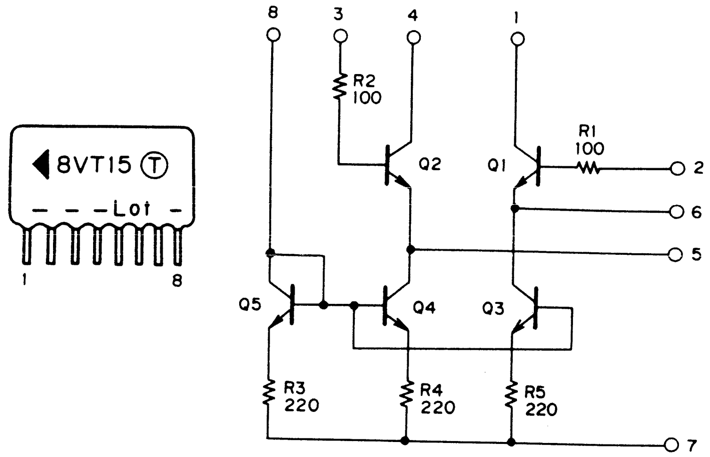
— VC2061 —

Cross Talk Cancel Circuit


Vcc 1
0HC IN 4
1 HC IN 5
1 HC IN 6
2 HC IN 7
BIAS CAP 2
11
2 GND
10 GND
12 OUT 1
9 OUT 2
8
MAX
MIN
MAX
MIN
MAX
MIN
LEVEL CTL
LEVEL CTL

— 8VT15 —

H-IC

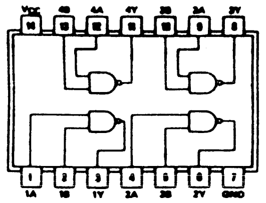

8VT15 Ⓣ
- - - -Lot -
1
8
8
3
4
1
R2 100
R1 100
Q2
Q1
Q5
Q4
Q3
R3 220
R4 220
R5 220
2
6
5
7

— 74 Families Of Compatible TTL Circuits —

00

Nand Gates

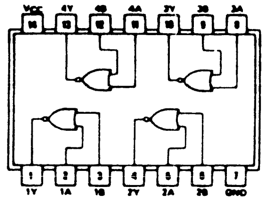
$Y = \overline{AB}$



02

Nor Gates

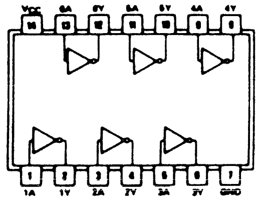
$Y = \overline{A+B}$



04

Hex Inverters

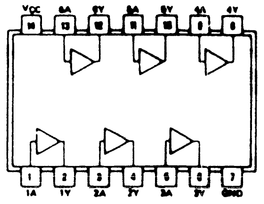
$Y = \overline{A}$



07

Hex Buffers/Drivers

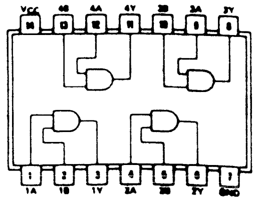
$Y = A$



08

And Gates

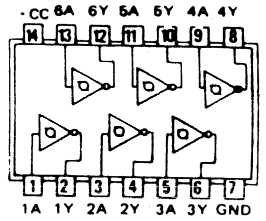
$Y = AB$



14

Hex Schmitt-Trigger Inverters

$Y = \overline{A}$

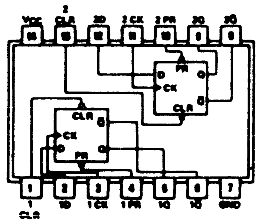

VCC 6A 6Y 5A 5Y 4A 4Y
14 13 12 11 10 9 8
1 2 3 4 5 6 7
1A 1Y 2A 2Y 3A 3Y GND

74

D-Type Flip-Flops

FUNCTION TABLE

INPUTS				OUTPUTS	
PRESET	CLEAR	CLOCK	D	Q	$\overline{Q}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H*	H*
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q_0	$\overline{Q}_0$



86

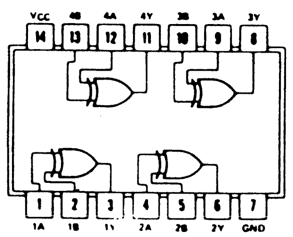
Exclusive-Or Gates

$Y = A \oplus B = \overline{A}B+A\overline{B}$

FUNCTION TABLE

INPUTS		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

H = high level, L = low level

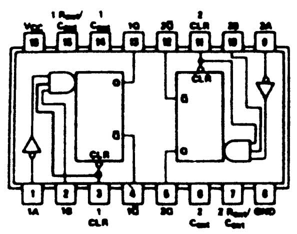


123

Retriggerable Monostable Multivibrators

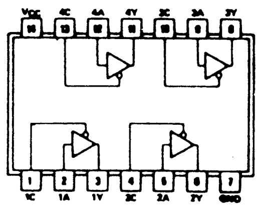
FUNCTION TABLE

INPUTS			OUTPUTS	
CLEAR	A	B	Q	$\overline{Q}$
L	X	X	L	H
X	H	X	L*	H*
X	X	L	L*	H*
H	L	↑	⎍	⊔
H	↓	H	⎍	⊔
↑	L	H	⎍	⊔



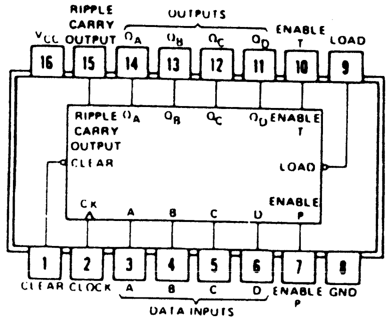
125

Buss Buffer Gates



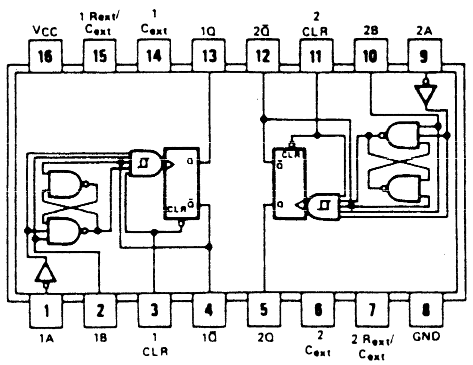
163

Synchronous 4-bit Counters


RIPPLE CARRY OUTPUT
OUTPUTS
ENABLE T
LOAD
CLEAR
CLOCK
ENABLE P
DATA INPUTS
VCC
GND

221

Monostable Multivibrators

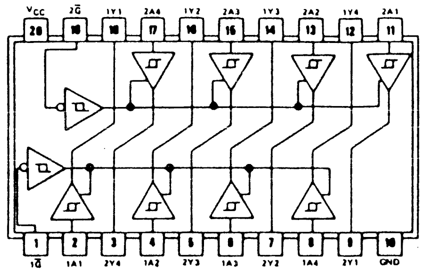

VCC
1 Rext/Cext
1 Cext
1Q
2Q̄
2 CLR
2B
2A
16
15
14
13
12
11
10
9
1
2
3
4
5
6
7
8
1A
1B
1 CLR
1Q̄
2Q
2 Cext
2 Rext/Cext
GND
CLR
Q
Q̄

FUNCTION TABLE
(EACH MONOSTABLE)

INPUTS			OUTPUTS	
CLEAR	A	B	Q	Q̄
L	X	X	L	H
X	H	X	L*	H*
X	X	L	L*	H*
H	L	↑	⊓	⊔
H	↓	H	⊓	⊔
↑	L	H	⊓	⊔

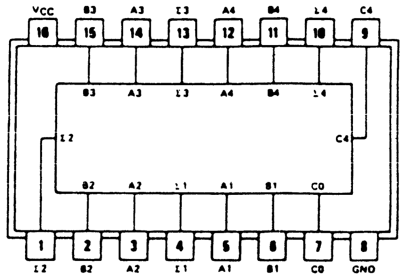
244

Octal Buffers And Line Drivers


VCC
2Ḡ
1Y1
2A4
1Y2
2A3
1Y3
2A2
1Y4
2A1
20
19
18
17
16
15
14
13
12
11
1
2
3
4
5
6
7
8
9
10
1Ḡ
1A1
2Y4
1A2
2Y3
1A3
2Y2
1A4
2Y1
GND

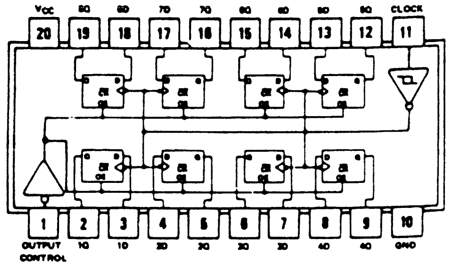
283

4-bit Binary Full Adders


VCC
B3
A3
Σ3
A4
B4
Σ4
C4
16
15
14
13
12
11
10
9
Σ2
C4
B2
A2
Σ1
A1
B1
C0
1
2
3
4
5
6
7
8
Σ2
B2
A2
Σ1
A1
B1
C0
GND

374

Octal D-Type Flip-Flops

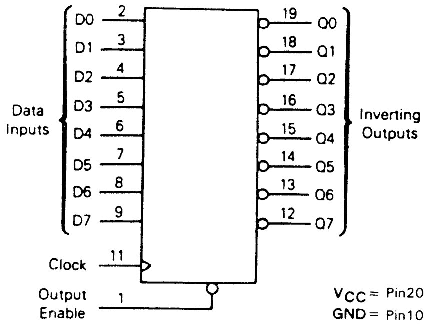

VCC
8Q
8D
7D
7Q
6Q
6D
5D
5Q
CLOCK
20
19
18
17
16
15
14
13
12
11
1
2
3
4
5
6
7
8
9
10
OUTPUT CONTROL
1Q
1D
2D
2Q
3Q
3D
4D
4Q
GND

FUNCTION TABLE

OUTPUT CONTROL	CLOCK	D	OUTPUT
L	↑	H	H
L	↑	L	L
L	L	X	Q_0
H	X	X	Z

564

Octal D-Type Flip-Flop

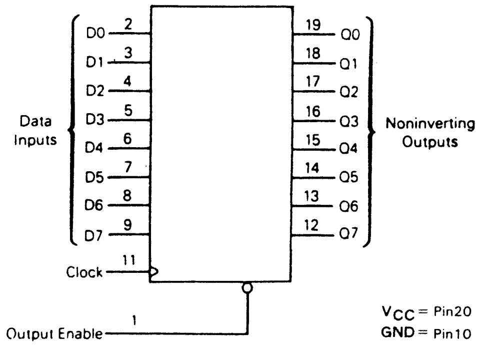

D0
D1
D2
D3
D4
D5
D6
D7
2
3
4
5
6
7
8
9
Data Inputs
19
18
17
16
15
14
13
12
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Inverting Outputs
Clock
11
Output Enable
1
VCC = Pin20
GND = Pin10

Inputs			Output
Output Enable	Clock	D	Q
L	↑	H	L
L	↑	L	H
L	L	X	no change
H	X	X	Z

X = don't care
Z = high impedance

574

Octal D-Type Flip-Flop

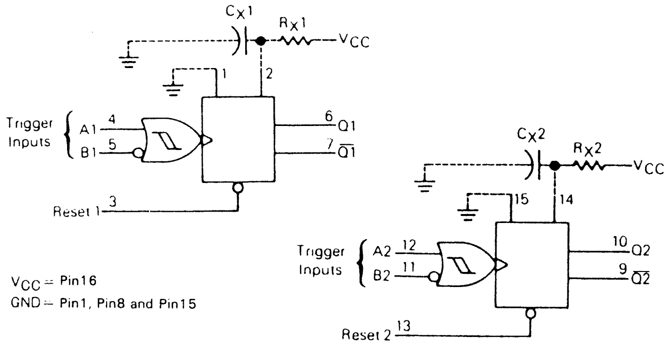

D0
D1
D2
D3
D4
D5
D6
D7
2
3
4
5
6
7
8
9
Data Inputs
19
18
17
16
15
14
13
12
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Noninverting Outputs
Clock
11
Output Enable
1
VCC = Pin20
GND = Pin10

Inputs			Output
Output Enable	Clock	D	Q
L	↑	H	H
L	↑	L	L
L	L	X	no change
H	X	X	Z

X = don't care
Z = high impedance

4538

Precision Monostable Multivibrators


Cx1
Rx1
VCC
1
2
Trigger Inputs
A1
4
B1
5
6
Q1
7
Q̄1
Reset 1
3
Cx2
Rx2
VCC
15
14
Trigger Inputs
A2
12
B2
11
10
Q2
9
Q̄2
Reset 2
13
VCC = Pin16
GND = Pin1, Pin8 and Pin15

Inputs			Outputs	
Reset	A	B	Q	Q̄
H	↑	H	⊓	⊔
H	L	↓	⊓	⊔
H	X	L	Not Triggered	
H	H	X	Not Triggered	
H	L, H, ↓	H	Not Triggered	
H	L	L, H, ↑	Not Triggered	
L	X	X	L	H
↓, ↑	X	X	Not Triggered	

SECTION 5
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

NOTE:

- [M] indicates mechanical symbol number.

Page

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding 5-2
5.1.2 Fuse coding 5-3

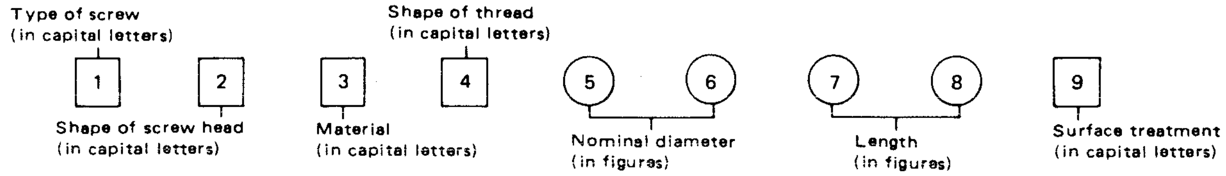
5.2 EXPLODED VIEWS AND PARTS LIST

5.2.1 Chassis assembly <M2> 5-4
5.2.2 Packing assembly <M1> 5-6

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding

Standard screw part numbers are as follows.

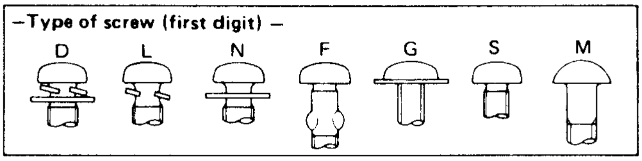

Type of screw
(in capital letters)
Shape of thread
(in capital letters)
1
2
3
4
5
6
7
8
9
Shape of screw head
(in capital letters)
Material
(in capital letters)
Nominal diameter
(in figures)
Length
(in figures)
Surface treatment
(in capital letters)

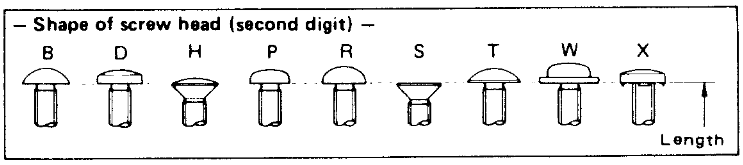
Type of screw (first digit)

S	Normal screws
D	Assembled machine screws (with plain and spring washers)
L	" (with spring washer)
N	" (with plain washer)
F	Feather screws
G	Washer head tapping screws
M	Wood screws

Shape of screw head (second digit)

B	Brazier head
D	Binding head
H	Oval countersunk head
P	Pan head
R	Round head
S	Flat head
T	Truss head
W	Washer head (machine screws)
X	Toothed head


–Type of screw (first digit) –

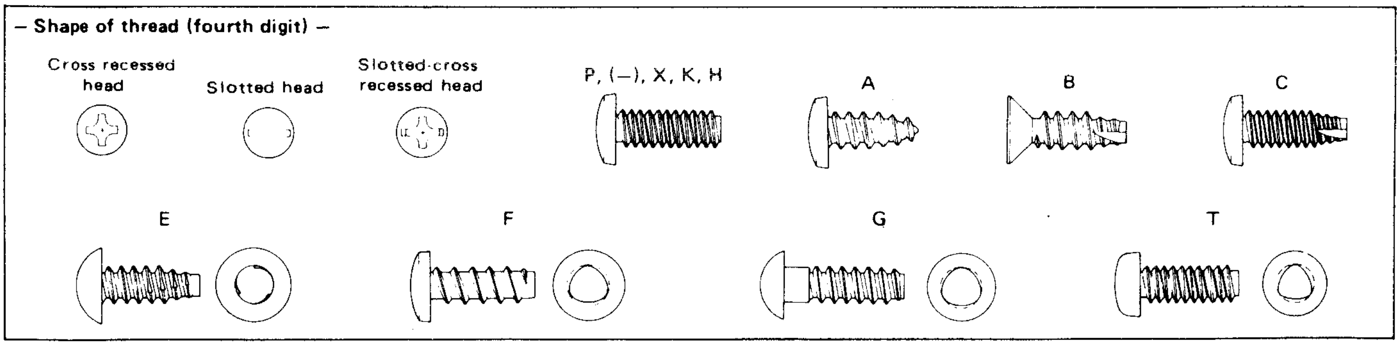

– Shape of screw head (second digit) –
B
D
H
P
R
S
T
W
X
Length

Material (third digit)

S	Steel
E	Stainless steel
C	Cast iron
U	Copper
B	Brass
P	Phosphor bronze
N	Nickel silver
Y	Cast brass
A	Aluminum
Z	Zinc alloy
K	Polycarbonate

Shape of thread (fourth digit)

P	Cross recessed head screws
(–)	Slotted head machine screws
X	Slotted-cross recessed head machine screws
K	Cross recessed head machine screws for precision equipment (type 1)
H	" (type 3)
A	Cross recessed head tapping screws (type 1)
B	" (type 2)
C	" (type 3)
E	Cross recessed head special tapping screws (brand : evertight)
F	" (brand : P-tight)
T	" (brand : taptight)
G	"


– Shape of thread (fourth digit) –
Cross recessed head
Slotted head
Slotted-cross recessed head
P, (–), X, K, H
A
B
C
E
F
G
T

Nominal diameter (fifth and sixth digits)

The fifth and sixth digits are numbers indicating a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

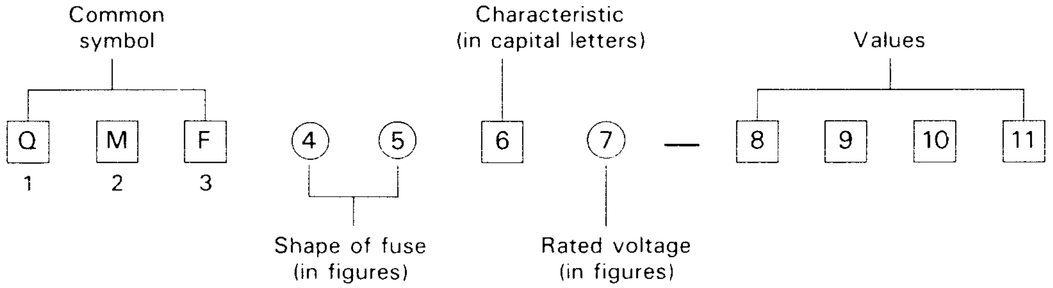
The seventh and eighth digits are numbers indicating length in milimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

Z	Dichromate treatment after galvanizing (MFZn Ⅱ-C)
N	Nickel plating (MFNi Ⅱ, MFNi Ⅰ)
R	Chromium plating (MBCr Ⅱ, MBCr Ⅰ)
G	Silver plating (SP4)
B	Black coating after plating
F	Blackening of iron (FB)
M	Blackening after galvanizing
K	Pickling of brass (PF2)
P	Phosphate treatment
W	Uni-chrome plating
L	Coating with transparent paint
A	Coloring red after galvanizing (MFZn Ⅱ-C)
C	Coloring blue after galvanizing (MFZn Ⅱ-C)
T	Coloring green after galvanizing (MFZn Ⅱ-C)
V	Coloring purple after galvanizing (MFZn Ⅱ-C)

5.1.2 Fuse coding

Standard fuse part numbers are as follows.


Common symbol
Characteristic (in capital letters)
Values
Q
M
F
4
5
6
7
—
8
9
10
11
1
2
3
Shape of fuse (in figures)
Rated voltage (in figures)

Shape of fuse
(fourth and fifth digits)

51	φ5.2 × 20 mm
60	φ6.4 × 30 mm
61	φ6.35 × 31.8 mm
63	φ6.4 × 30 mm with lead wires
66	φ6.35 × 31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V 1.25 – 6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:

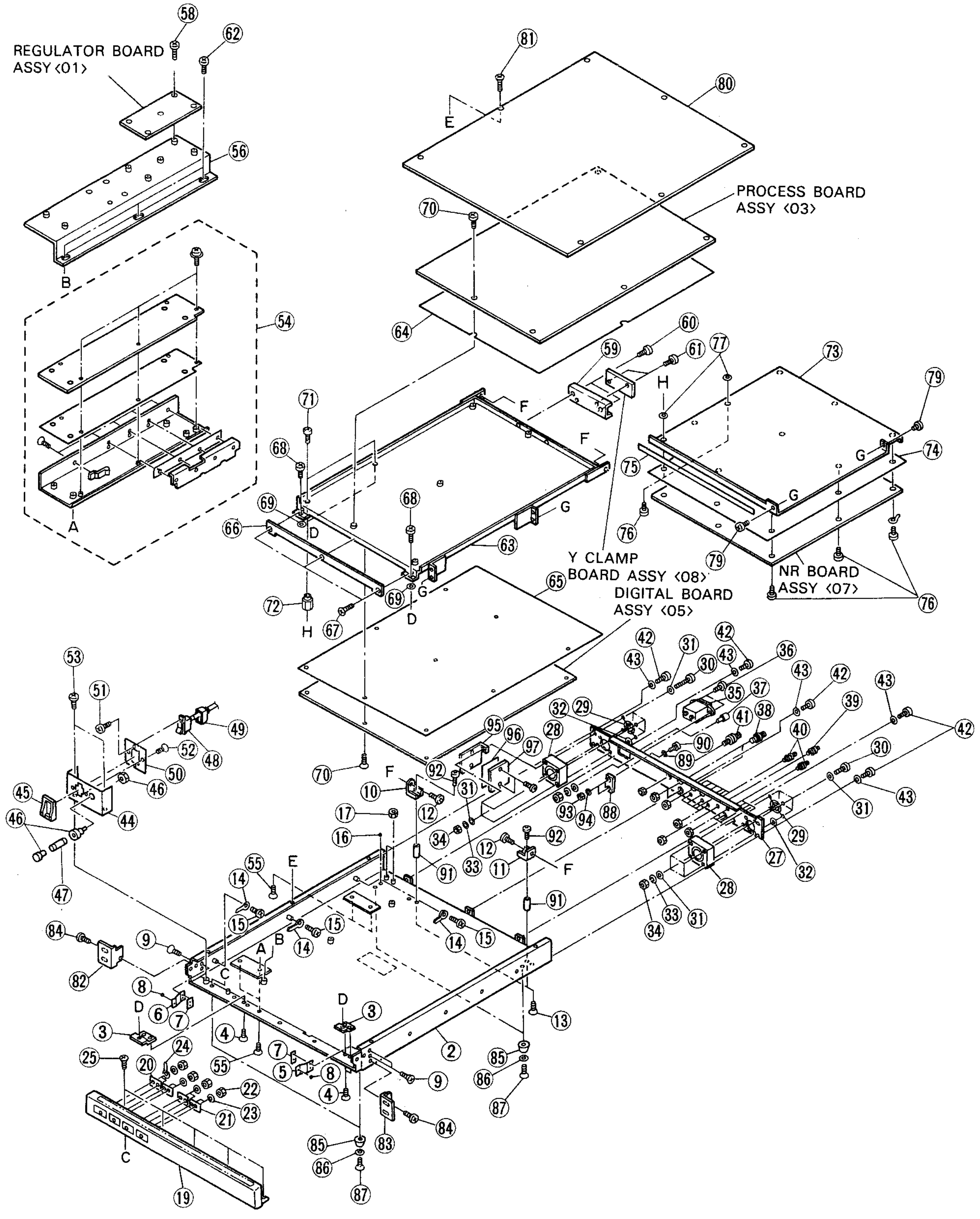
R63	.... 0.63 A
1R0	.... 1.0 A
2R5	.... 2.5 A
100	.... 10 A
R315	.... 0.315 A
1R25	.... 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

5.2 EXPLODED VIEWS AND PARTS LIST

5.2.1 Chassis assembly <M2>


REGULATOR BOARD ASSY <01>
PROCESS BOARD ASSY <03>
Y CLAMP BOARD ASSY <08>
DIGITAL BOARD ASSY <05>
NR BOARD ASSY <07>
A
B
C
D
E
F
G
H
58
62
56
54
81
80
70
64
60
59
61
77
73
79
74
75
76
71
68
69
66
63
72
67
65
53
51
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48
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32
29
28
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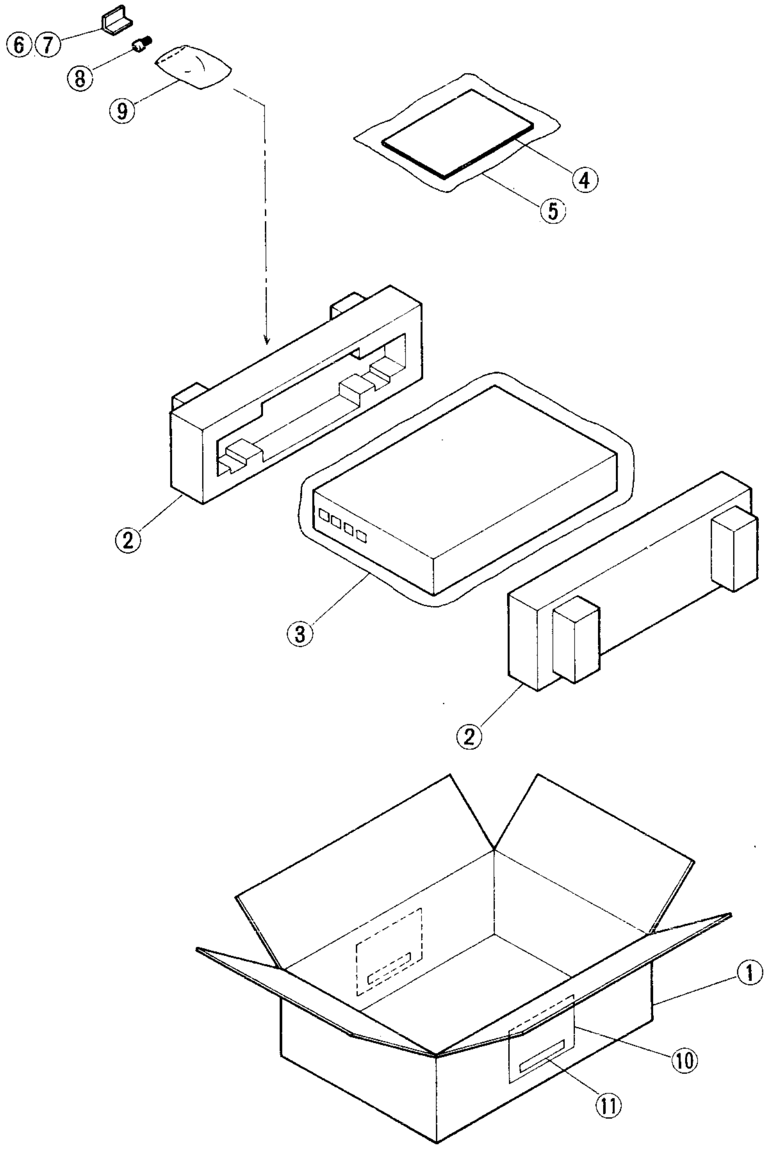
89
95
96
97
92
10
12
17
16
93
94
88
34
33
11
91
27
2
55
14
15
84
9
82
8
6
7
3
4
25
24
20
22
23
21
5
13
85
86
87
83
19

CHASSIS ASSEMBLY <M2>

#▲	REF NO.	PART NO.	PART NAME, DESCRIPTION	Q'TY
	2	PGZ01166-007	CHASSIS	1
	3	PGZ01166-021	BRACKET	2
	4	SSSP3006N	SCREW	4
	5	PGZ00910-030	SPRING PLATE(R)	1
	6	PGZ00910-031	SPRING PLATE(L)	1
	7	PGZ00910-029	PLATE	2
	8	PGZ00910-038	BEARING	2
	9	SSSP3006N	SCREW	4
	10	PGZ01166-019	SUPPORTER(L)	1
	11	PGZ01166-020	SUPPORTER(R)	1
	12	SDSP4008N	SCREW	2
	13	SSSP4006N	SCREW	4
	14	PU49485-2	WIRE CLAMP	3
	15	SDSP3006N	SCREW	3
▲	16	PU44457	STICKER	1
	17	NNS4000N	NUT	2
	19	PGZ01224-011	FRONT PANEL	1
	20	PGZ01166-003	LED BOARD ASSY, RED	1
	21	PGZ01166-004	LED BOARD ASSY, GREEN	3
	22	NNS3000N	NUT	8
	23	WNS3000N	WASHER	8
	24	PU49485-2	WIRE CLAMP	1
	25	SDSP3004N	SCREW	5
	27	PGZ01224-012	REAR PANEL	1
	28	PGZ01157	FAN MOTOR	2
	29	PGZ01158	FAN GUARD	2
	30	SDSP3025N	SCREW	8
	31	WNS3000N	WASHER	16
	32	WAE3000N	WASHER	8
	33	WLS3000N	WASHER	8
	34	NNS3000N	NUT	8
▲	35	PGZ01224-061	AC INLET	1
	36	SDSP3010M	SCREW	2
▲	37	PGZ00910-073	EARTH TERMINAL	1
	38	PGZ00910-060	7P CONNECTOR, OUTPUT	2
	39	PGZ00910-059	7P CONNECTOR, INPUT	1
	40	PGZ00910-058	BNC CONNECTOR	10
	41	PGZ01224-065	6P CONNECTOR, REMOTE	1
	42	SDSP3006N	SCREW	7
	43	WAE3000N	WASHER	7
	44	PGZ01224-018	SW & FUSE BRACKET	1
	45	PGD40682	SW GUARD	1
▲	46	PGZ00910-078	FUSE HOLDER	1
▲	47	QMF51E2-1R25	FUSE	1
▲	48	QSE2A21-L01	POWER SW	1
▲	49	PU50479	SEESAW SW COVER	1
	50	PGZ01166-022	POWER SW BRACKET	1
	51	SDSP3006N	SCREW	2
	52	SDSP3004N	SCREW	2
	53	SDSP3006N	SCREW	2
▲	54	PGZ01224-063	POWER SUPPLY	1
	55	SSSP4010N	SCREW	4
	56	PGZ01166-013	PSY SHIELD ASSY	1
	58	SDSP3006N	SCREW	5
	59	PGZ01224-015	SHIELD PLATE	1
	60	SDSP3006N	SCREW	2
	61	SDSP3006N	SCREW	2
	62	SDSP3006N	SCREW	3
	63	PGZ01224-014	SHIELD PLATE ASSY	1
	64	PGZ01224-016	INSULATOR(A)	1
	65	PGZ01224-017	INSULATOR(B)	1
	66	PGZ01224-020	INDICATION PLATE	1
	67	SDSP2004M	SCREW	3
	68	PGZ00910-028	SCREW	2
	69	PGZ00910-040	WASHER	2
	70	SDSP3006N	SCREW	18
	71	SDSP3004N	SCREW	2
	72	PGZ01224-022	STUD SPACER	2
	73	PGZ01166-015	SHIELD PLATE	1
	74	PGZ01166-018	INSULATOR(C)	1
	75	PGZ01166-024	PLATE	1
	76	SDSP3006N	SCREW	10
	77	PGZ01166-025	SPACER	2
	79	PGZ00910-027	PIN	2
	80	PGZ00910-019	TOP PLATE	1
	81	SSSP3006N	SCREW	7
	82	—	RACK EAR(L), SEE <M1>	-
	83	—	RACK EAR(R), SEE <M1>	-
	84	—	SCREW , SEE <M1>	-
	85	PGZ00910-039	FOOT	4
	86	WNS3000N	WASHER	4
	87	SDSP3012N	SCREW	4
▲	88	PGZ00373	VOLTAGE SELECTOR	1
	89	WAE3000N	WASHER	2
	90	SDSP3010N	SCREW	2
	91	PGZ01166-023	STUD SPACER	4
	92	SDSP3006N	SCREW	4
	93	NNS3000N	NUT	2
	94	WLS3000N	WASHER	2
▲	95	PGD41376	BRACKET	1
▲	96	PU51853	INSULATOR COVER	1
▲	97	PGE40020-1-3	LINE FILTER BOARD	1
▲	97A	PGZ01340	LINE FILTER	1
▲	97B	PGZ01230	FERRITE CORE	1

5.2.2 Packing assembly <M1>



PACKING ASSEMBLY <M1>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	1	PGZ01166-042	PACKING CASE
	2	PGZ01166-044	CUSHION ASSY
	3	PGZ01166-045	POLY BAG
	4	PGD30002-170	INSTRUCTIONS
	5	QPGB024-03404	POLY BAG
	6	PGZ01166-039	RACK EAR(L)
	7	PGZ01166-040	RACK EAR(R)
	8	SDSP4008N	SCREW, X6
	9	QPGB024-03404	POLY BAG
	10	PRD30329-02	PACKING LABEL, X2
	11	PGD40914-02	LABEL, X2

SECTION 6
ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS– All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precistion Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS–All capacitance values are in μF, unless otherwise indicated.

pF	: $\mu\mu$F (Pico farad)
C Cap	: Caramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

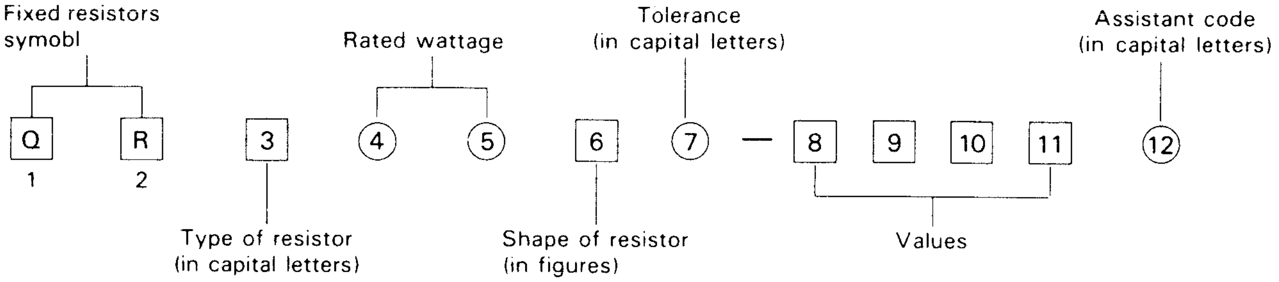
NOTES:

- [2 digits] indicates circuit board symbol number.
- "X " indicates quantities for use.
- IC symbol number with Roman letter indicates location on the circuit board.

6.1 STANDARD PART NUMBER CODING

6.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.


Fixed resistors
symobl
Rated wattage
Tolerance
(in capital letters)
Assistant code
(in capital letters)
Q
R
1
2
3
4
5
6
7
—
8
9
10
11
12
Type of resistor
(in capital letters)
Shape of resistor
(in figures)
Values

Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	± 1 %
G	± 2 %
J	± 5 %
K	± 10 %
M	± 20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead taping
Z	Lead taping

Values (eighth – tenth or eleventh digits)

examples:

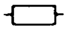
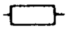
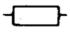
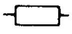
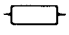
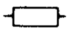
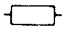
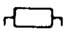
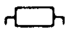
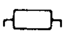
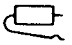
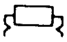
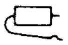
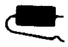
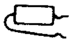
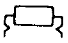
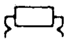
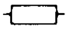
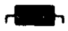
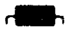
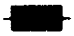
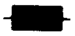
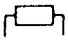
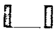
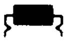
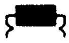
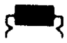
R47		0.47 Ω
4R7		4.7 Ω
470	47×10^0	47 Ω
471	47×10^1	470 Ω
472	47×10^2	4.7 kΩ
473	47×10^3	47 kΩ
474	47×10^4	470 kΩ
475	47×10^5	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^0	464 Ω
4641	464×10^1	4.64 kΩ
4642	464×10^2	46.4 kΩ

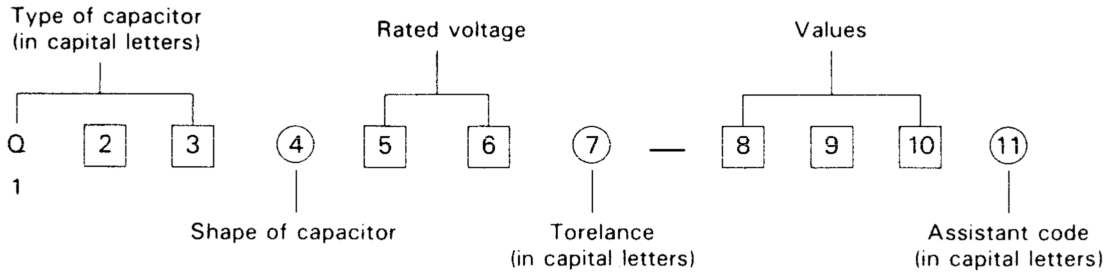
Shape of resistor (sixth digit)

Note: ■ marks are flame retardant resistor.

Shape of resistor \ Type of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				 Chip			
9			Lug (C) type							

6.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.


Type of capacitor
(in capital letters)
Rated voltage
Values
Q
1
2
3
4
5
6
7
—
8
9
10
11
Shape of capacitor
Torelance
(in capital letters)
Assistant code
(in capital letters)

Ceramic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
			Normal		Flame retardant	
Symbol	Characteristics	Tubular	Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit / Fifth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	±20 %
F	±1 %	N	±30 %
G	±2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	±5 %	X	$^{+40}_{-20}$ %
K	±10 %	Z	$^{+80}_{-20}$ %

Values (eighth — tenth digits)

Example : Values are in picofarads

101 ....10×10^1 pF............. 100 pF
102 ....10×10^2 pF............. 1,000 pF (0.001 μF)
103 ....10×10^3 pF............. 10,000 pF (0.01 μF)
104 ....10×10^4 pF............. 100,000 pF (0.1 μF)
105 ....10×10^5 pF............. 1 μF
5R0 .... 5.0 pF

Assistant code (eleventh digit)

G	Small size
Z	Lead taping
Y	Lead taping

6.2 ELECTRICAL PARTS LIST

****
* REGULATOR BOARD ASSEMBLY <01> *
****

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	PWBA	PGE20304A-01	REGULATOR BOARD ASSY
	IC1	TA78009AP	IC
	R1	QRD167J-391	RESISTOR
	C1	PU58948-104	CAPACITOR
	C2	PU58948-104	CAPACITOR
	C3	QETA1EM-107	E CAPACITOR
	C4	QCF11HP-103	CAPACITOR
	C5	QCF11HP-103	CAPACITOR
	C6	PU58948-104	CAPACITOR
	C7	PU58948-104	CAPACITOR
	C8	QETA1CM-227	E CAPACITOR
	C9	PU58948-104	CAPACITOR
	C10	PU58948-104	CAPACITOR
	C11	QETA1CM-227	E CAPACITOR
	C12	PU58948-104	CAPACITOR
	C13	PU58948-104	CAPACITOR
	C14	PU58948-104	CAPACITOR
	C15	PU58948-104	CAPACITOR
	C16	PU58948-104	CAPACITOR
	C17	QETA1CM-227	E CAPACITOR
	C18	PU58948-104	CAPACITOR
	C19	QETA1EM-227	E CAPACITOR
	C20	PU58948-104	CAPACITOR
	C21	QETA1EM-227	E CAPACITOR
	C22	PU58948-104	CAPACITOR
	C23	QETA1CM-227	E CAPACITOR
	C24	PU58948-104	CAPACITOR
	C25	QETA1EM-227	E CAPACITOR
	C26	PU58948-104	CAPACITOR
	C27	QETA1EM-227	E CAPACITOR
	C28	PU58948-104	CAPACITOR
	C29	PU58948-104	CAPACITOR
	C30	QETA1CM-227	E CAPACITOR
	C31	QETA1CM-227	E CAPACITOR
	L1	PGZ00643	COIL
	L2	PGZ00643	COIL
	LC1	PGZ01223-002	N FILTER
	LC2	PGZ01223-002	N FILTER
	LC3	PGZ01223-002	N FILTER
	LC4	PGZ01223-002	N FILTER
	LC5	PGZ01223-002	N FILTER
	K1	PGZ01222-001	FERRITE BEADS
	K2	PGZ01222-001	FERRITE BEADS
	K3	PGZ01222-001	FERRITE BEADS
	K4	PGZ01222-001	FERRITE BEADS
	K5	PGZ01222-001	FERRITE BEADS
	K6	PGZ01222-001	FERRITE BEADS
	K7	PGZ01222-001	FERRITE BEADS
	K8	PGZ01222-001	FERRITE BEADS
	K9	PGZ01222-001	FERRITE BEADS
⚠	TH1	PU52108-6R8K	POSITIVE THERMISTOR
	K10	PGZ01222-001	FERRITE BEADS
	K11	PGZ01222-001	FERRITE BEADS
	K12	PGZ01222-001	FERRITE BEADS
	K13	PGZ01222-001	FERRITE BEADS
	K14	PGZ01222-001	FERRITE BEADS
	K15	PGZ01222-001	FERRITE BEADS
	K16	PGZ01222-001	FERRITE BEADS
	HS1	PGD40694	HEAT SINK
	TP1	PGZ00587-00	TEST PIN, X2
	CN1	PGZ01224-058	CAP HOUSING, X3(CN1,2,9)
	CN3	PGZ01224-057	CAP HOUSING
	CN4	PGZ01224-059	CAP HOUSING, X3(CN4,6,7)
	CN5	PGZ01224-056	CAP HOUSING, X2(CN5,8)
⚠	CP1	ICP-N50	CIRCUIT PROTECTOR
⚠	CP2	ICP-N50	CIRCUIT PROTECTOR

****
* NOISE REDUCER BOARD ASSEMBLY <07> *
****

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PRK10011A-02	NOISE REDUCER BOARD ASSY
	IC1	TC74AC574P	IC
	IC2	74F283PC	IC
	IC3	74F283PC	IC
	IC4	HM63021P-34	IC
	IC5	TC74HC574AP	IC
	IC6	74F283PC	IC
	IC7	74F283PC	IC
	IC8	PGD30533	IC
	IC9	TC74AC86P	IC
	IC10	TC74AC574P	IC
	IC11	TMS4C1050NL-3	IC
	IC12	TMS4C1050NL-3	IC
	IC13	TC74HC08AP	IC
	IC14	TC74AC574P	IC
	IC15	TC74AC564P	IC
	IC16	74F04PC	IC
	IC17	TC74AC04P	IC
	IC18	TC74AC574P	IC
	IC19	TC74AC74P	IC
	IC20	TC74AC08P	IC
	IC21	TC74AC574P	IC
	IC22	74F574PC	IC
	IC101	TC74HC574AP	IC
	IC102	HA19510	IC
	IC103	HM63021P-34	IC
	IC106	HA19510	IC
	IC107	HM63021P-34	IC
	IC108	HA19510	IC
	IC109	74F04PC	IC
	IC301	8VT15	IC
		OR HMC-229	IC
	IC302	8VT15	IC
		OR HMC-229	IC
	IC303	8VT15	IC
		OR HMC-229	IC
	IC304	8VT15	IC
		OR HMC-229	IC
	IC305	8VT15	IC
		OR HMC-229	IC
	IC306	TA7347P	IC
	IC307	8VT15	IC
		OR HMC-229	IC
	IC308	VC2061	IC
	IC309	8VT15	IC
		OR HMC-229	IC
	IC310	TA7347P	IC
	IC311	TC74HC08AP	IC
	Q101	2SC1740S(R)	TRANSISTOR
	Q102	2SC1740S(R)	TRANSISTOR
	Q103	2SC1740S(R)	TRANSISTOR
	Q201	2SC1740S(R)	TRANSISTOR
	Q202	2SC1740S(R)	TRANSISTOR
	Q203	2SC1740S(R)	TRANSISTOR
	Q204	2SC1740S(R)	TRANSISTOR
	Q205	2SC1740S(R)	TRANSISTOR
	Q206	2SC1740S(R)	TRANSISTOR
	Q207	2SC1740S(R)	TRANSISTOR
	Q208	2SC1740S(R)	TRANSISTOR
	Q209	2SC1740S(R)	TRANSISTOR
	Q210	2SC1740S(R)	TRANSISTOR
	Q211	2SC1740S(R)	TRANSISTOR
	Q212	2SC1740S(R)	TRANSISTOR
	Q301	2SC1740S(R)	TRANSISTOR
	Q302	2SC1740S(R)	TRANSISTOR
	Q303	2SA933S(R)	TRANSISTOR
	Q304	2SC1740S(R)	TRANSISTOR
	Q305	2SC1740S(R)	TRANSISTOR
	Q306	2SC1740S(R)	TRANSISTOR
	Q307	2SC1740S(R)	TRANSISTOR
	Q308	2SC1740S(R)	TRANSISTOR
	Q309	2SA933S(R)	TRANSISTOR
	Q310	2SC1740S(R)	TRANSISTOR
	Q311	2SC1740S(R)	TRANSISTOR
	Q312	2SA933S(R)	TRANSISTOR
	Q313	2SC1740S(R)	TRANSISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q314	2SC1740S(R)	TRANSISTOR
	Q315	2SC1740S(R)	TRANSISTOR
	Q316	2SC1740S(R)	TRANSISTOR
	Q317	2SC1740S(R)	TRANSISTOR
	Q318	2SC1740S(R)	TRANSISTOR
	Q319	2SC1740S(R)	TRANSISTOR
	Q320	2SC1740S(R)	TRANSISTOR
	Q321	2SC1740S(R)	TRANSISTOR
	Q322	2SA933S(R)	TRANSISTOR
	Q323	2SC1740S(R)	TRANSISTOR
	Q324	2SC1740S(R)	TRANSISTOR
	Q325	2SC1740S(R)	TRANSISTOR
	Q326	2SA933S(R)	TRANSISTOR
	Q327	2SC1740S(R)	TRANSISTOR
	Q329	2SC1740S(R)	TRANSISTOR
	Q330	2SC1740S(R)	TRANSISTOR
	Q331	2SA933S(R)	TRANSISTOR
	D101	1SS133	DIODE
	D102	1SS133	DIODE
	D103	1SS133	DIODE
	D104	1SS133	DIODE
	D105	1SS133	DIODE
	D106	1SS133	DIODE
	D201	RD4.3EB2	ZENER DIODE
	D202	RD4.3EB2	ZENER DIODE
	D203	RD4.3EB2	ZENER DIODE
	D301	1SS133	DIODE
	D302	1SS133	DIODE
	D303	1SS99	DIODE
	D304	1SS99	DIODE
	D305	1SS133	DIODE
	D306	1SS99	DIODE
	D307	1SS99	DIODE
	R1	QRD167J-472	RESISTOR
	R2	QRD167J-472	RESISTOR
	R3	QRD167J-472	RESISTOR
	R4	QRD167J-472	RESISTOR
	R5	QRD167J-472	RESISTOR
	R6	QRD167J-391	RESISTOR
	R9	QRD167J-472	RESISTOR
	R10	QRD167J-472	RESISTOR
	R11	QRD167J-472	RESISTOR
	R12	QRD167J-472	RESISTOR
	R13	QRD167J-472	RESISTOR
	R14	QRD167J-472	RESISTOR
	R15	QRD167J-472	RESISTOR
	R16	QRD167J-101	RESISTOR
	R17	QRD167J-332	RESISTOR
	R18	QRD167J-821	RESISTOR
	R19	QRD167J-151	RESISTOR
	R20	QRD167J-821	RESISTOR
	R21	QRD167J-151	RESISTOR
	R22	QRD161J-102	RESISTOR
	R101	QRD167J-221	RESISTOR
	R102	QRD167J-221	RESISTOR
	R103	QRD167J-221	RESISTOR
	R104	QRD167J-820	RESISTOR
	R105	QRD167J-820	RESISTOR
	R106	QRD167J-820	RESISTOR
	R107	QRD167J-472	RESISTOR
	R108	QRD167J-101	RESISTOR
	R201	QVZ3507-471	V RESISTOR
	R202	QRD167J-182	RESISTOR
	R203	QRD167J-473	RESISTOR
	R204	QRD167J-153	RESISTOR
	R205	QRD167J-121	RESISTOR
	R206	QRD167J-152	RESISTOR
	R207	QRD167J-391	RESISTOR
	R208	QRV143F-2401	CMF RESISTOR
	R209	QRD167J-391	RESISTOR
	R210	QRD167J-122	RESISTOR
	R211	QRD167J-152	RESISTOR
	R212	QRD167J-121	RESISTOR
	R213	QRD167J-153	RESISTOR
	R214	QRD167J-473	RESISTOR
	R215	QRD167J-121	RESISTOR
	R216	QRD167J-182	RESISTOR
	R217	QVZ3507-471	V RESISTOR
	R218	QRD167J-182	RESISTOR
	R219	QRD167J-473	RESISTOR
	R220	QRD167J-153	RESISTOR
	R221	QRD167J-121	RESISTOR
	R222	QRD167J-152	RESISTOR
	R223	QRD167J-391	RESISTOR
	R224	QRV143F-2401	CMF RESISTOR
	R225	QRD167J-391	RESISTOR
	R226	QRD167J-122	RESISTOR
	R227	QRD167J-152	RESISTOR
	R228	QRD167J-121	RESISTOR
	R229	QRD167J-153	RESISTOR
	R230	QRD167J-473	RESISTOR
	R231	QRD167J-121	RESISTOR
	R232	QRD167J-182	RESISTOR
	R233	QVZ3507-471	V RESISTOR
	R234	QRD167J-182	RESISTOR
	R235	QRD167J-473	RESISTOR
	R236	QRD167J-153	RESISTOR
	R237	QRD167J-121	RESISTOR
	R238	QRD167J-152	RESISTOR
	R239	QRD167J-391	RESISTOR
	R240	QRV143F-2401	CMF RESISTOR
	R241	QRD167J-391	RESISTOR
	R242	QRD167J-122	RESISTOR
	R243	QRD167J-152	RESISTOR
	R244	QRD167J-121	RESISTOR
	R245	QRD167J-153	RESISTOR
	R246	QRD167J-473	RESISTOR
	R247	QRD167J-121	RESISTOR
	R248	QRD167J-182	RESISTOR
	R249	QRD167J-121	RESISTOR
	R250	QRD167J-121	RESISTOR
	R251	QRD167J-121	RESISTOR
	R301	QRD167J-221	RESISTOR
	R302	QRD167J-471	RESISTOR
	R303	QRD167J-101	RESISTOR
	R304	QRD167J-471	RESISTOR
	R305	QVZ3507-221	V RESISTOR
	R306	QRD167J-152	RESISTOR
	R307	QRD167J-471	RESISTOR
	R308	QRD167J-391	RESISTOR
	R309	QVZ3507-471	V RESISTOR
	R310	QRD167J-102	RESISTOR
	R311	QRD167J-272	RESISTOR
	R312	QRD167J-221	RESISTOR
	R313	QRD167J-391	RESISTOR
	R314	QRD167J-392	RESISTOR
	R315	QRD167J-391	RESISTOR
	R316	QRD167J-102	RESISTOR
	R317	QRD167J-101	RESISTOR
	R318	QVZ3507-221	V RESISTOR
	R319	QRD167J-272	RESISTOR
	R320	QRD167J-221	RESISTOR
	R321	QRD167J-4R7	RESISTOR
	R322	QRD167J-4R7	RESISTOR
	R323	QRD167J-680	RESISTOR
	R324	QRD167J-221	RESISTOR
	R325	QRD167J-471	RESISTOR
	R326	QRD167J-221	RESISTOR
	R327	QRD167J-471	RESISTOR
	R329	QRD167J-152	RESISTOR
	R330	QRD167J-471	RESISTOR
	R331	QRD167J-391	RESISTOR
	R332	QVZ3507-471	V RESISTOR
	R333	QRD167J-102	RESISTOR
	R334	QRD167J-272	RESISTOR
	R335	QRD167J-221	RESISTOR
	R336	QRD167J-102	RESISTOR
	R337	QRD167J-102	RESISTOR
	R338	QRD167J-471	RESISTOR
	R339	QRD167J-122	RESISTOR
	R340	QRD167J-122	RESISTOR
	R341	QRD167J-332	RESISTOR
	R342	QRD167J-152	RESISTOR
	R343	QRD167J-102	RESISTOR
	R344	QRD167J-102	RESISTOR
	R345	QRD167J-472	RESISTOR
	R346	QRD167J-102	RESISTOR
	R347	QRD167J-152	RESISTOR
	R348	QRD167J-222	RESISTOR
	R349	QRD167J-103	RESISTOR
	R350	QRD167J-332	RESISTOR
	R351	QRD167J-122	RESISTOR
	R352	QRD167J-122	RESISTOR
	R353	QVZ3507-221	V RESISTOR
	R354	QRD167J-272	RESISTOR
	R355	QRD167J-221	RESISTOR
	R356	QRD167J-101	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R357	QRD167J-152	RESISTOR
	R358	QRD167J-221	RESISTOR
	R359	QRD167J-471	RESISTOR
	R360	QRD167J-101	RESISTOR
	R361	QRD167J-471	RESISTOR
	R362	QVZ3507-221	V RESISTOR
	R363	QRD167J-152	RESISTOR
	R364	QRD167J-471	RESISTOR
	R365	QRD167J-391	RESISTOR
	R366	QVZ3507-471	V RESISTOR
	R367	QRD167J-102	RESISTOR
	R368	QRD167J-272	RESISTOR
	R369	QRD167J-221	RESISTOR
	R370	QRD167J-102	RESISTOR
	R371	QRD167J-102	RESISTOR
	R372	QRD167J-471	RESISTOR
	R373	QVZ3507-101	V RESISTOR
	R374	QRD167J-471	RESISTOR
	R375	QRD167J-101	RESISTOR
	R376	QRD167J-152	RESISTOR
	R377	QRD167J-222	RESISTOR
	R378	QRD167J-103	RESISTOR
	R379	QRD167J-332	RESISTOR
	R380	QRD167J-122	RESISTOR
	R381	QRD167J-122	RESISTOR
	R382	QRD167J-391	RESISTOR
	R383	QVZ3507-221	V RESISTOR
	R384	QRD167J-272	RESISTOR
	R385	QRD167J-221	RESISTOR
	R386	QRD167J-101	RESISTOR
	R387	QRD167J-152	RESISTOR
	R388	QRD167J-472	RESISTOR
	R389	QRD167J-472	RESISTOR
	R390	QRD167J-102	RESISTOR
	R391	QRD167J-272	RESISTOR
	R392	QRD167J-152	RESISTOR
	R393	QRD167J-470	RESISTOR
	R394	QRD167J-470	RESISTOR
	RA1	EXB-P84472M	RESISTOR ARRAY
	RA2	EXB-P88222M	RESISTOR ARRAY
	RA3	EXB-P88222M	RESISTOR ARRAY
	RA101	EXB-P88222M	RESISTOR ARRAY
	C1	QETA1CM-227	E CAPACITOR
	C2	QETA1CM-227	E CAPACITOR
	C3	QCZ0214-103	CAPACITOR
	C4	QEE41CM-475	TANTAL CAPACITOR
	C5	QCZ0214-103	CAPACITOR
	C6	QCZ0214-103	CAPACITOR
	C7	QEE41CM-475	TANTAL CAPACITOR
	C8	PU58948-104	CAPACITOR
	C9	QCZ0214-103	CAPACITOR
	C10	QCZ0214-103	CAPACITOR
	C11	QCZ0214-103	CAPACITOR
	C12	QCZ0214-103	CAPACITOR
	C13	QEE41CM-475	TANTAL CAPACITOR
	C14	QCZ0214-103	CAPACITOR
	C15	QEE41CM-475	TANTAL CAPACITOR
	C16	PU58948-104	CAPACITOR
	C17	PU58948-104	CAPACITOR
	C18	QCZ0214-103	CAPACITOR
	C19	QCZ0214-103	CAPACITOR
	C20	QEE41CM-475	TANTAL CAPACITOR
	C21	QCZ0214-103	CAPACITOR
	C22	PU58948-104	CAPACITOR
	C23	QCZ0214-103	CAPACITOR
	C24	QCZ0214-103	CAPACITOR
	C25	QEE41CM-475	TANTAL CAPACITOR
	C26	QCZ0214-103	CAPACITOR
	C27	QCZ0214-103	CAPACITOR
	C28	QCZ0214-103	CAPACITOR
	C29	QCZ0214-103	CAPACITOR
	C30	PU58948-104	CAPACITOR
	C32	QEE41AM-475	TANTAL CAPACITOR
	C33	QEE41AM-475	TANTAL CAPACITOR
	C101	PU58948-104	CAPACITOR
	C102	QETA1AM-227	E CAPACITOR
	C103	PU58948-104	CAPACITOR
	C104	QEE41AM-475	TANTAL CAPACITOR
	C105	QCZ0214-103	CAPACITOR
	C106	PU58948-104	CAPACITOR
	C107	PU58948-104	CAPACITOR
	C108	PU58948-104	CAPACITOR
	C109	QETA1AM-227	E CAPACITOR
	C110	PU58948-104	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C111	PU58948-104	CAPACITOR
	C112	PU58948-104	CAPACITOR
	C113	QEE41EM-105	T CAPACITOR
	C114	PU58948-104	CAPACITOR
	C115	QEE41AM-475	TANTAL CAPACITOR
	C116	QETA1AM-476	E CAPACITOR
	C117	PU58948-104	CAPACITOR
	C118	PU58948-104	CAPACITOR
	C119	PU58948-104	CAPACITOR
	C120	QEE41EM-105	T CAPACITOR
	C121	PU58948-104	CAPACITOR
	C122	QEE41AM-475	TANTAL CAPACITOR
	C123	QETA1AM-476	E CAPACITOR
	C124	PU58948-104	CAPACITOR
	C125	PU58948-104	CAPACITOR
	C126	PU58948-104	CAPACITOR
	C127	QEE41EM-105	T CAPACITOR
	C128	PU58948-104	CAPACITOR
	C129	QEE41AM-475	TANTAL CAPACITOR
	C130	QETA1AM-476	E CAPACITOR
	C133	QCZ0214-103	CAPACITOR
	C134	QEE41AM-475	TANTAL CAPACITOR
	C135	QEE41AM-475	TANTAL CAPACITOR
	C136	QEE41AM-475	TANTAL CAPACITOR
	C137	PU58948-104	CAPACITOR
	C138	PU58948-104	CAPACITOR
	C139	PU58948-104	CAPACITOR
	C201	QETA1AM-476	E CAPACITOR
	C202	PU58948-104	CAPACITOR
	C203	QETA1AM-476	E CAPACITOR
	C204	PU58948-104	CAPACITOR
	C205	QETA1AM-337	E CAPACITOR
	C206	QETA1AM-476	E CAPACITOR
	C207	QETA1AM-476	E CAPACITOR
	C208	QETA1AM-476	E CAPACITOR
	C209	QETA1AM-476	E CAPACITOR
	C210	PU58948-104	CAPACITOR
	C211	QETA1AM-476	E CAPACITOR
	C212	PU58948-104	CAPACITOR
	C213	QETA1AM-337	E CAPACITOR
	C214	QETA1AM-476	E CAPACITOR
	C215	QETA1AM-476	E CAPACITOR
	C216	QETA1AM-476	E CAPACITOR
	C217	QETA1AM-476	E CAPACITOR
	C218	PU58948-104	CAPACITOR
	C219	QETA1AM-476	E CAPACITOR
	C220	PU58948-104	CAPACITOR
	C221	QETA1AM-337	E CAPACITOR
	C222	QETA1AM-476	E CAPACITOR
	C223	QETA1AM-476	E CAPACITOR
	C224	QETA1AM-476	E CAPACITOR
	C228	QETA1AM-476	E CAPACITOR
	C229	QETA1AM-476	E CAPACITOR
	C230	QETA1AM-476	E CAPACITOR
	C301	PU58948-104	CAPACITOR
	C302	PU58948-104	CAPACITOR
	C303	QCT05CH-470	CAPACITOR
	C304	QETA1AM-107	E CAPACITOR
	C305	QETA1AM-107	E CAPACITOR
	C306	QETA1AM-107	E CAPACITOR
	C307	QEE41AM-106	T CAPACITOR
	C308	QEE41AM-106	T CAPACITOR
	C309	QETA1AM-107	E CAPACITOR
	C310	QETA1AM-477	E CAPACITOR
	C311	QEE41AM-106	T CAPACITOR
	C312	QEE41AM-106	T CAPACITOR
	C313	QETA1AM-107	E CAPACITOR
	C314	QETA1AM-227	E CAPACITOR
	C315	QETA1AM-227	E CAPACITOR
	C316	QETA1AM-108	E CAPACITOR
	C317	PU58948-104	CAPACITOR
	C318	PU58948-104	CAPACITOR
	C319	QCT05CH-470	CAPACITOR
	C320	QETA1AM-107	E CAPACITOR
	C321	QETA1AM-107	E CAPACITOR
	C322	QETA1AM-107	E CAPACITOR
	C323	QEE41AM-106	T CAPACITOR
	C324	QEE41AM-106	T CAPACITOR
	C325	QETA1AM-107	E CAPACITOR
	C326	QETA1AM-107	E CAPACITOR
	C327	QETA1AM-107	E CAPACITOR
	C328	QETA1AM-107	E CAPACITOR
	C329	QETA1AM-107	E CAPACITOR
	C330	QETA1AM-107	E CAPACITOR
	C331	QEE41AM-106	T CAPACITOR
	C332	QEN41CM-476	NP E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C333	QEN41CM-476	NP E CAPACITOR
	C334	QEE41AM-106	T CAPACITOR
	C335	QEPA1CM-106	NP E CAPACITOR
	C336	QEPA1CM-106	NP E CAPACITOR
	C337	QEE41CM-106	TANTAL CAPACITOR
	C338	PU58948-104	CAPACITOR
	C339	PU58948-104	CAPACITOR
	C340	QCT05CH-470	CAPACITOR
	C341	QETA1AM-107	E CAPACITOR
	C342	QETA1AM-107	E CAPACITOR
	C343	QETA1AM-107	E CAPACITOR
	C344	QEE41AM-106	T CAPACITOR
	C345	QEE41AM-106	T CAPACITOR
	C346	QEN41CM-476	NP E CAPACITOR
	C347	QETA1AM-107	E CAPACITOR
	C348	QETA1AM-476	E CAPACITOR
	C349	QETA1AM-107	E CAPACITOR
	C350	PU58948-104	CAPACITOR
	C351	QCT05CH-470	CAPACITOR
	C352	QETA1AM-107	E CAPACITOR
	C353	QETA1AM-476	E CAPACITOR
	C354	QEE41AM-106	T CAPACITOR
	C355	QEPA1CM-106	NP E CAPACITOR
	C356	QEE41AM-106	T CAPACITOR
	C357	QEPA1CM-106	NP E CAPACITOR
	C358	QEPA1CM-106	NP E CAPACITOR
	C359	QEE41CM-106	TANTAL CAPACITOR
	C360	QETA1AM-227	E CAPACITOR
	C361	QETA1AM-227	E CAPACITOR
	C362	PU58948-104	CAPACITOR
	C363	QETA1CM-227	E CAPACITOR
	C364	QETA1CM-227	E CAPACITOR
	C365	QETA1AM-227	E CAPACITOR
	C366	QETA1AM-227	E CAPACITOR
	C367	QETA1AM-227	E CAPACITOR
	C368	QETA1AM-227	E CAPACITOR
	C369	QEE41AM-106	T CAPACITOR
	C370	QETA1AM-227	E CAPACITOR
	C371	QCT05CH-121	CAPACITOR
	LPF201	PGZ01235	LOW PASS FILTER
	LPF202	PGZ01235	LOW PASS FILTER
	LPF203	PGZ01235	LOW PASS FILTER
	LPF301	PGZ01164	LOW PASS FILTER
	LC1	PGZ01161-223	N FILTER
	DL301	PGZ01162	DELAY LINE
	DL302	PGZ01163	DELAY LINE
	DL303	PGZ01162	DELAY LINE
	DL304	PGZ01162	DELAY LINE
	LC101	PGZ01161-223	N FILTER
	LC301	PGZ01161-223	N FILTER
	LC302	PGZ01161-223	N FILTER
	LC303	PGZ01161-223	N FILTER
	SW1	PGZ01166-046	SWITCH
	SW2	PGZ01166-047	SWITCH
	SW3	PGZ01166-048	SWITCH
	SW4	PU54440	SWITCH
	SW5	PU54440	SWITCH
	K1	PGZ01222-001	FERRITE BEADS
	K2	PGZ01222-001	FERRITE BEADS
	K3	PGZ01222-001	FERRITE BEADS
	K101	PGZ01222-001	FERRITE BEADS
	K102	PGZ01222-001	FERRITE BEADS
	K103	PGZ01222-001	FERRITE BEADS
	K104	PGZ01222-001	FERRITE BEADS
	K201	PGZ01222-001	FERRITE BEADS
	K202	PGZ01222-001	FERRITE BEADS
	K203	PGZ01222-001	FERRITE BEADS
	K204	PGZ01222-001	FERRITE BEADS
	K205	PGZ01222-001	FERRITE BEADS
	K206	PGZ01222-001	FERRITE BEADS
	K301	PGZ01222-001	FERRITE BEADS
	K302	PGZ01222-001	FERRITE BEADS
	K303	PGZ01222-001	FERRITE BEADS
	K304	PGZ01222-001	FERRITE BEADS
	K305	PGZ01222-001	FERRITE BEADS
	K306	PGZ01222-001	FERRITE BEADS
	K307	PGZ01222-001	FERRITE BEADS
	K308	PGZ01222-001	FERRITE BEADS
	K309	PGZ01222-001	FERRITE BEADS
	K310	PGZ01222-001	FERRITE BEADS
	K311	PGZ01222-001	FERRITE BEADS
	K312	PGZ01222-001	FERRITE BEADS
	K313	PGZ01222-001	FERRITE BEADS
	K314	PGZ01222-001	FERRITE BEADS
	K315	PGZ01222-001	FERRITE BEADS
	SKT1	PGZ01166-052	IC SOCKET
	SLD1	PGZ01289	FERRITE PLATE
	TP1	PGZ00587-00	TEST PIN, X11
	TP2	PGZ00587-03	TEST PIN, X11
	CN1	PGZ01224-054	CONNECTOR
	CN2	PGZ01166-049	IC SOCKET
	CN3	PGZ01224-055	CONNECTOR
	CN4	PGZ01166-050	CAP HOUSING, X3(CN4,7,8)
	CN6	PGZ01166-051	CAP HOUSING

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Y CLAMP BOARD ASSEMBLY <08>

	PWBA	PRK30014A	Y CLAMP BOARD ASSY
	IC1	AN1082	IC
	IC2	AN1082	IC
	IC3	TC4538BP	IC
	Q1	2SC1740S(R)	TRANSISTOR
	Q3	2SK30A-OY	TRANSISTOR
	Q4	2SA933S(R)	TRANSISTOR
	Q5	2SK656	FE TRANSISTOR
	D1	1SS133	DIODE
	R1	QRD167J-750	RESISTOR
	R2	QRD167J-333	RESISTOR
	R3	QRD167J-181	RESISTOR
	R4	QRD167J-333	RESISTOR
	R5	QRD167J-152	RESISTOR
	R6	QRD167J-101	RESISTOR
	R11	QRD167J-471	RESISTOR
	R12	QRD167J-105	RESISTOR
	R13	QRD167J-0R0	RESISTOR
	R14	QRD167J-273	RESISTOR
	R15	QVZ3507-472	V RESISTOR
	R16	QRD167J-123	RESISTOR
	R17	QRD167J-103	RESISTOR
	R18	QRD167J-0R0	RESISTOR
	R21	QRD167J-392	RESISTOR
	R22	QRD167J-122	RESISTOR
	R23	QRD167J-225	RESISTOR
	R24	QRD167J-181	RESISTOR
	R25	QRD167J-222	RESISTOR
	R26	QRD167J-101	RESISTOR
	R27	QRD167J-472	RESISTOR
	R28	QRD167J-473	RESISTOR
	R29	QRD167J-103	RESISTOR
	R30	QRD167J-181	RESISTOR
	C1	QETA1CM-476	E CAPACITOR
	C2	QETA1CM-476	E CAPACITOR
	C3	QETA1CM-476	E CAPACITOR
	C4	PU58948-104	CAPACITOR
	C5	QEN41CM-106	NP E CAPACITOR
	C7	QETA1CM-476	E CAPACITOR
	C8	PU58948-104	CAPACITOR
	C9	QCS11HJ-151	CAPACITOR
	C10	QCS11HJ-330	CAPACITOR
	C11	QFN41HJ-122	M CAPACITOR
	C12	QETA1CM-476	E CAPACITOR
	C13	PU58948-104	CAPACITOR
	C14	QEE41CM-475	TANTAL CAPACITOR
	C15	PU58948-104	CAPACITOR
	C16	PU58948-104	CAPACITOR
	C17	QETA1CM-476	E CAPACITOR
	C18	PU58948-104	CAPACITOR
	C19	QETA1CM-476	E CAPACITOR
	C20	PU58948-104	CAPACITOR
	C21	PU58948-104	CAPACITOR
	C22	QETA1CM-476	E CAPACITOR
	C23	PU58948-104	CAPACITOR
	C24	QCT05CH-560	CAPACITOR
	C25	QCT05CH-560	CAPACITOR
	C26	PU58948-104	CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	LC1	PGZ01161-223	N FILTER
	LC2	PGZ01161-223	N FILTER
	K1	PGZ01222-001	FERRITE BEADS
	K2	PGZ01222-001	FERRITE BEADS
	K3	PGZ01222-001	FERRITE BEADS
	TP1	PGZ00587-00	TEST PIN, X2
	TP3	PGZ00587-03	TEST PIN, X2
	CN1	PGZ01224-056	CAP HOUSING, X2(CN1,2)
	CN3	PGZ01166-051	CAP HOUSING
	CN4	PGZ01166-050	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION

* PROCESSOR BOARD ASSEMBLY <03> *

PART NO.	PART NAME, DESCRIPTION	(---------------				REF NO					---------------)	
		1	2	3	4	5	6	7	8	9	10	
PGZ01224-001	PROCESS BOARD ASSY	PWBA										(1)
SN74221	I C	IC45	IC52									(2)
SN74LS125A	I C	IC40	IC55									(2)
M5L74LS04	I C	IC39	IC56	IC60								(3)
M5L74LS14P	I C	IC44										(1)
M5L74LS74P	I C	IC43										(1)
M5L74LS123	I C	IC41	IC47	IC57								(3)
74F04	I C	IC53										(1)
74F74	I C	IC54										(1)
TC74HC00AP	I C	IC48	IC59									(2)
TC74HC02AP	I C	IC58										(1)
TC74HC04AP	I C	IC61										(1)
TC74HC14AP	I C	IC46										(1)
TC74HC221P	I C	IC42	IC49	IC50	IC51							(4)
MC14053B	I C	IC12	IC16	IC68								(3)
AN612	I C	IC21	IC63	IC64								(3)
CXL5003	I C	IC24	IC28									(2)
HA11247	I C	IC36										(1)
TX429M	I C	IC7	IC31									(2)
NJM2228S	I C	IC25	IC26									(2)
M51271SP	I C	IC14										(1)
LF353N	I C	IC2	IC4	IC8	IC30	IC38	IC67	IC69	IC70	IC71	IC75	(10)
UPC4082C	I C	IC3	IC13	IC15	IC34							(4)
LM393N	I C	IC23										(1)
MC1414P	I C	IC18	IC22									(2)
TA78L005AP	I C	IC19	IC33									(2)
TA78L009AP	I C	IC74										(1)
MC1648P	I C	IC27										(1)
CX-894	I C	IC11	IC62									(2)
TL607	I C	IC32	IC35									(2)
TL610	I C	IC6										(1)
NJM2233AS	I C	IC9	IC10	IC29	IC37	IC65	IC72	IC73				(7)
NJM2235S	I C	IC1										(1)
CXD1175P	I C	IC5	IC17	IC20								(3)
MB40778	I C	IC66	IC76									(2)
2SA1015GR	TRANSISTOR	Q3	Q7	Q9	Q10	Q12	Q15	Q20	Q21	Q23	Q28	
		Q30	Q32	Q34	Q37	Q38	Q45	Q48	Q50	Q51	Q52	
		Q53	Q55	Q60	Q62	Q63	Q66	Q67	Q68	Q71	Q72	
		Q75	Q77	Q79	Q81	Q83	Q84	Q86	Q93			(38)
2SB738	TRANSISTOR	Q85										(1)
2SC1815GR	TRANSISTOR	Q1	Q2	Q4	Q5	Q6	Q8	Q11	Q13	Q14	Q16	
		Q17	Q18	Q19	Q22	Q24	Q25	Q26	Q27	Q29	Q31	
		Q33	Q35	Q36	Q39	Q40	Q41	Q42	Q43	Q44	Q46	
		Q47	Q49	Q54	Q56	Q57	Q58	Q59	Q61	Q64	Q65	
		Q69	Q70	Q73	Q74	Q76	Q78	Q80	Q82	Q87	Q88	
		Q90	Q91	Q92								(53)
MV2114	DIODE	D10										(1)
VO3C	DIODE	D22										(1)
05Z6·2Y	DIODE	D18										(1)
05Z6·8Y	DIODE	D4	D24									(2)
1N34A	DIODE	D16										(1)
1S1588	DIODE	D1	D2	D3	D5	D6	D7	D8	D9	D11	D12	
		D13	D14	D15	D17	D19	D20	D21	D25	D26	D30	
		D31	9									(22)
PGC1MC1HX102	C PLASTIC	C12	C48	C90	C91	C97	C101	C114	C115	C119	C150	
		C155	C159	C219	C220	C221	C226	C232	C242	C250	C273	
		C318	C332	C373	C397	C402	C416	C443	C501			(28)

PART NO.	PART NAME, DESCRIPTION	(----- REF NO									-----)	
		1	2	3	4	5	6	7	8	9	10	
PGC1MC1HX152	C PLASTIC	C494										(1)
PGC1MC1HX682	C PLASTIC	C270										(1)
PGC1MC1HY103	C PLASTIC	C18	C23	C99	C103	C104	C105	C108	C109	C110	C111	
		C121	C161	C184	C185	C187	C190	C197	C202	C203	C205	
		C207	C212	C222	C225	C230	C234	C235	C243	C252	C259	
		C277	C286	C290	C302	C306	C326	C327	C343	C359	C363	
		C367										(41)
PGC1MC1HY153	C PLASTIC	C196										(1)
PGC1MC1HY223	C PLASTIC	C42	C313									(2)
PGC1MC1HY333	C PLASTIC	C278										(1)
PGC1MC1HY473	C PLASTIC	C149	C276	C329	C484							(4)
QCZ0214-104	C CERAMIC	C1	C2	C3	C4	C17	C19	C24	C25	C29	C34	
		C36	C38	C41	C43	C44	C45	C47	C49	C64	C66	
		C67	C68	C74	C75	C77	C81	C82	C84	C89	C95	
		C96	C98	C100	C107	C117	C122	C123	C127	C132	C133	
		C134	C136	C137	C138	C141	C142	C144	C145	C146	C151	
		C157	C162	C163	C167	C172	C173	C174	C175	C176	C178	
		C181	C186	C188	C189	C191	C193	C195	C198	C199	C200	
		C206	C208	C217	C218	C223	C224	C228	C237	C239	C241	
		C255	C260	C261	C262	C264	C265	C267	C268	C271	C272	
		C274	C279	C280	C281	C282	C284	C288	C292	C293	C294	
		C297	C299	C300	C304	C305	C308	C310	C315	C316	C321	
		C328	C330	C334	C335	C339	C340	C341	C342	C347	C348	
		C350	C352	C356	C357	C358	C362	C364	C365	C366	C368	
		C374	C377	C383	C384	C390	C392	C393	C394	C395	C398	
		C399	C400	C401	C403	C404	C405	C407	C409	C412	C418	
		C419	C420	C422	C423	C428	C437	C438	C442	C452	C453	
		C456	C457	C458	C459	C462	C463	C465	C467	C474	C476	
		C477	C498									(172)
PGC2A3CHB050	C CERAMIC	C369	C496									(2)
PGC2A3CHB080	C CERAMIC	C112	C229	C444								(3)
PGC2A3CHB090	C CERAMIC	C411										(1)
PGC2A3CHC100	C CERAMIC	C72	C380									(2)
PGC2A3CHC150	C CERAMIC	C15	C54	C57	C129	C169	C233	C421	C432	C435	C436	
		C439	C468	C471	C489	C492	C493					(16)
PGC2A3CHC200	C CERAMIC	C128	C168									(2)
PGC2A3CHC220	C CERAMIC	C322	C323	C336	C490							(4)
PGC2A3CHC270	C CERAMIC	C370	C481									(2)
PGC2A3CHC300	C CERAMIC	C6	C14	C475								(3)
PGC2A3CHC470	C CERAMIC	C51	C491	C499								(3)
PGC2A3CHC510	C CERAMIC	C482										(1)
PGC2A3CHC560	C CERAMIC	C244										(1)
PGC2A3CHC620	C CERAMIC	C500										(1)
PGC2A3CHC680	C CERAMIC	C93	C331	C337								(3)
PGC2A3CHC910	C CERAMIC	C32	C35	C59	C63	C179	C182	C214	C216	C303	C353	
		C355	C371	C375	C497							(14)
PGC2A3CHD101	C CERAMIC	C52	C183	C249	C254	C317						(5)
PGC2A3CHD121	C CERAMIC	C13	C92	C210	C245							(4)
PGC2A3CHD131	C CERAMIC	C480										(1)
PGC2A3CHD151	C CERAMIC	C414	C415	C448	C450							(4)
PGC2A3CHD181	C CERAMIC	C33	C61	C354								(3)
PGC2A3CHD201	C CERAMIC	C156	C372	C410	C417	C446	C451	C483				(7)
PGC2A3CHD221	C CERAMIC	C85	C312	C333	C344							(4)
PGC2A3CHD271	C CERAMIC	C143	C495									(2)
PGC2A3CHD301	C CERAMIC	C152										(1)
PGC2A3CHD331	C CERAMIC	C192										(1)
PGC2A3CHD391	C CERAMIC	C86	C311									(2)
PGC2A3CHD471	C CERAMIC	C319										(1)
PGC2A3CHD511	C CERAMIC	C124	C125	C164	C165							(4)
PGC2A3CHD561	C CERAMIC	C413	C449									(2)
PGC2A3CHD681	C CERAMIC	C87	C153	C275								(3)
PGC2A3CHE102	C CERAMIC	C126	C166									(2)
PGC2DU1HC680	C CERAMIC	C213										(1)
PGC2DU1HD121	C CERAMIC	C27	C88	C236	C238							(4)
PGC2DU1HD181	C CERAMIC	C83	C180	C215	C256							(4)

		(--------------- REF NO ---------------)										
PART NO.	PART NAME, DESCRIPTION	1	2	3	4	5	6	7	8	9	10	
PGC3TC1VA474	C TA ELYC	C147	C211	C251	C307							(4)
PGC3TC1VB1R0	C TA ELYC	C102	C253	C470								(3)
PGC3TC1VB4R7	C TA ELYC	C227	C231									(2)
QETA0JM-476	C AL ELYC	C21	C381									(2)
QETA0JM-107	C AL ELYC	C16	C22	C40	C53	C118	C120	C131	C154	C160	C171	
		C177	C194	C240	C269	C295	C314	C320	C324	C338	C349	
		C360	C379	C386	C425	C427	C429	C445	C461			(28)
QETA0JM-227	C AL ELYC	C46	C50	C291	C351	C431	C434					(6)
QETA0JM-477	C AL ELYC	C39	C58	C80	C135	C287	C385	C391	C426	C464	C466	(10)
QETA1CM-106	C AL ELYC	C20	C258	C289								(3)
QETA1CM-226	C AL ELYC	C201	C204									(2)
QETA1CM-476	C AL ELYC	C5	C7	C8	C69	C76	C78	C79	C116	C396	C472	(10)
QETA1CM-107	C AL ELYC	C9	C11	C26	C28	C55	C56	C70	C71	C73	C94	
		C130	C158	C170	C209	C266	C283	C298	C378	C388	C406	
		C408	C424	C430	C440	C441	C447	C454	C455			(28)
QETA1CM-227	C AL ELYC	C433										(1)
QETA1EM-475	C AL ELYC	C285	C309									(2)
QETA1HM-105	C AL ELYC	C65	C106	C148	C263	C361	C382	C460				(7)
QETA1HM-475	C AL ELYC	C246	C247									(2)
PGC51ZW1053	C VARIABLE	VC3	VC6									(2)
PGC51ZW2553	C VARIABLE	VC4	VC5									(2)
PGC51ZW3053	C VARIABLE	VC1	VC2									(2)
QRD143J-823	R CARBON	R31										(1)
QRD143J-150	R CARBON	R469										(1)
QRD143J-330	R CARBON	R366										(1)
QRD143J-470	R CARBON	R484										(1)
QRD143J-510	R CARBON	R160										(1)
QRD143J-680	R CARBON	R1	R45	R68	R77	R112	R119	R129	R195	R232	R252	
		R257	R268	R291	R298	R344	R363	R379	R414	R418	R420	
		R433	R436	R442	R447	R468	R479	R481				(27)
QRD143J-750	R CARBON	R60	R158	R186	R399	R417	R424	R428	R444	R449	R450	(10)
QRD143J-820	R CARBON	R278	R467									(2)
QRD143J-101	R CARBON	R59	R67	R151	R180	R311	R480					(6)
QRD143J-121	R CARBON	R168										(1)
QRD143J-151	R CARBON	R65										(1)
QRD143J-181	R CARBON	R339										(1)
QRD143J-201	R CARBON	R110	R148	R150	R177	R179	R250					(6)
QRD143J-221	R CARBON	R5	R92	R300								(3)
QRD143J-271	R CARBON	R3	R100	R362	R374							(4)
QRD143J-301	R CARBON	R47	R78	R79	R121	R188	R247	R497				(7)
QRD143J-331	R CARBON	R28	R102	R140	R157	R185	R288	R315	R316	R317		(9)
QRD143J-361	R CARBON	R226	R228	R408	R458							(4)
QRD143J-391	R CARBON	R27	R377									(2)
QRD143J-471	R CARBON	R48	R82	R108	R169	R170	R190	R191	R271	R280	R325	
		R340	R341	R368								(13)
QRD143J-511	R CARBON	R55	R101	R372								(3)
QRD143J-561	R CARBON	R24	R54	R115	R235	R281	R462					(6)
QRD143J-621	R CARBON	R74	R107	R354	R358							(4)
QRD143J-681	R CARBON	R113	R159	R236	R264	R383	R394	R397	R398	R410	R452	
		R459										(11)
QRD143J-751	R CARBON	R15	R46	R69	R111	R127	R128	R204	R258	R360	R403	
		R413	R457	R465								(13)
QRD143J-821	R CARBON	R152	R178	R193	R225	R348	R370					(6)
QRD143J-911	R CARBON	R364	R503									(2)
QRD143J-102	R CARBON	R22	R26	R33	R40	R53	R56	R61	R70	R76	R90	
		R93	R103	R117	R138	R141	R142	R146	R153	R155	R175	
		R181	R183	R196	R207	R213	R230	R231	R233	R269	R282	
		R285	R297	R30	R307	R308	R342	R359	R367	R369	R375	

		(- - - - - -			- - REF NO - -					- - - - - -)	
PART NO.	PART NAME, DESCRIPTION	1	2	3	4	5	6	7	8	9	10	
QRD143J-102	R CARBON	R402	R409	R415	R421	R427	R434	R438	R443	R445	R454	
		R461	R466	R476	R477	R498						(55)
QRD143J-112	R CARBON	R371										(1)
QRD143J-122	R CARBON	R11	R51	R91	R109	R123	R208	R215	R245	R248	R254	
		R255	R290	R302	R304	R314	R482					(16)
QRD143J-152	R CARBON	R19	R57	R58	R80	R106	R116	R149	R176	R223	R279	
		R286	R295	R365	R393	R396	R406	R407	R483			(18)
QRD143J-162	R CARBON	R21										(1)
QRD143J-182	R CARBON	R4	R52	R72	R120	R323	R334	R335				(7)
QRD143J-202	R CARBON	R41	R42	R63	R73	R154	R182	R219	R221	R266	R270	
		R293	R322	R387	R463	R473						(15)
QRD143J-222	R CARBON	R2	R20	R49	R85	R94	R99	R187	R194	R197	R218	
		R243	R246	R256	R263	R274	R313	R318	R324	R343	R347	
		R380										(21)
QRD143J-272	R CARBON	R29	R30	R130	R156	R184	R381	R504				(7)
QRD143J-302	R CARBON	R7	R10	R277	R460	R495						(5)
QRD143J-332	R CARBON	R6	R104	R118	R124	R283	R294	R493	R494			(8)
QRD143J-362	R CARBON	R86	R273	R330	R411	R412	R464					(6)
QRD143J-392	R CARBON	R25	R39	R44	R167	R203	R227	R301	R382	R496		(9)
QRD143J-432	R CARBON	R206	R229	R265								(3)
QRD143J-472	R CARBON	R8	R126	R201	R239	R242	R249	R267	R310	R328	R336	
		R351	R353	R355	R357							(14)
QRD143J-512	R CARBON	R71	R321	R455								(3)
QRD143J-562	R CARBON	R75	R125	R192	R216	R217	R309	R319	R376	R500	R501	(10)
QRD143J-622	R CARBON	R405										(1)
QRD143J-682	R CARBON	R9	R17	R404	R456							(4)
QRD143J-822	R CARBON	R134	R164	R224	R384							(4)
QRD143J-912	R CARBON	R95										(1)
QRD143J-103	R CARBON	R12	R13	R16	R23	R64	R83	R88	R96	R105	R114	
		R131	R139	R143	R145	R163	R171	R174	R189	R198	R214	
		R220	R222	R240	R241	R251	R253	R261	R292	R296	R299	
		R312	R332	R333	R361	R378	R485	R492				(37)
QRD143J-123	R CARBON	R87	R161	R326								(3)
QRD143J-153	R CARBON	R284	R327	R491	R499							(4)
QRD143J-163	R CARBON	R32	R386									(2)
QRD143J-183	R CARBON	R50	R147	R173	R260							(4)
QRD143J-203	R CARBON	R36	R212	R289								(3)
QRD143J-223	R CARBON	R34	R136	R166	R392	R395						(5)
QRD143J-273	R CARBON	R62										(1)
QRD143J-303	R CARBON	R209	R329	R338								(3)
QRD143J-393	R CARBON	R331										(1)
QRD143J-563	R CARBON	R14	R320	R337								(3)
QRD143J-823	R CARBON	R165										(1)
QRD143J-104	R CARBON	R38	R199	R237	R238	R262	R400	R453	R502			(8)
QRD143J-124	R CARBON	R84	R89	R234	R276							(4)
QRD143J-154	R CARBON	R132	R144	R172	R200	R352	R356					(6)
QRD143J-224	R CARBON	R35	R162	R244								(3)
QRD143J-304	R CARBON	R210										(1)
QRD143J-334	R CARBON	R37										(1)
QRD143J-474	R CARBON	R133	R137	R211								(3)
QRD143J-754	R CARBON	R135	R275									(2)
QRD143J-105	R CARBON	R81	R272	R287	R388	R389						(5)
QRD143J-755	R CARBON	R474	R475									(2)
QRV143F-75R0	R METAL	R97	R98	R122	R432	R439						(5)
QRV143F-2740	R METAL	R401	R451									(2)
QRV143F-3320	R METAL	R416	R419	R422	R423							(4)
QRV143F-3480	R METAL	R66	R345	R346	R349	R390	R391	R478				(7)

PART NO.	PART NAME, DESCRIPTION	(--------------- REF NO ---------------)										
		1	2	3	4	5	6	7	8	9	10	
QRV143F-3650	R METAL	R429										(1)
QRV143F-4020	R METAL	R425	R426	R430	R431	R435	R437	R440	R441	R446	R448	(10)
PGD4C6PD201	R VARIABLE	VR55	VR56									(2)
PGD4C6PD301	R VARIABLE	VR16										(1)
PGD4C6PD501	R VARIABLE	VR14	VR17	VR18	VR21	VR28	VR29	VR30	VR31	VR44	VR46	
		VR57	VR62	VR63	VR65							(14)
PGD4C6PE102	R VARIABLE	VR1	VR2	VR13	VR19	VR20	VR35	VR37	VR42	VR43	VR50	
		VR61										(11)
PGD4C6PE202	R VARIABLE	VR9	VR12	VR15	VR23	VR24	VR25	VR26	VR27	VR34	VR51	
		VR66										(11)
PGD4C6PE502	R VARIABLE	VR5	VR11	VR36	VR52	VR67						(5)
PGD4C6PF103	R VARIABLE	VR33	VR48	VR49								(3)
PGD4C6PF203	R VARIABLE	VR32	VR38	VR39	VR40	VR41						(5)
PGD4C6PF503	R VARIABLE	VR60										(1)
PGD4M7PE502	R VARIABLE	VR53	VR58									(2)
PGD4M7PG204	R VARIABLE	VR54	VR59									(2)
PGD40AS15B14	R VARIABLE	VR3	VR4	VR8								(3)
PGD40AS15B53	R VARIABLE	VR7										(1)
PGE2FL4HB1R0	INDUCTOR	L30	L32									(2)
PGE2FL4HB4R7	INDUCTOR	L20	L81									(2)
PGE2FL4HB6R8	INDUCTOR	L21	L22	L73	L74							(4)
PGE2FL5HC100	INDUCTOR	L14	L67	L68	L69							(4)
PGE2FL5HC120	INDUCTOR	L7	L42	L71								(3)
PGE2FL5HC220	INDUCTOR	L53										(1)
PGE2FL5HC330	INDUCTOR	L4	L16	L17	L24	L25	L52	L54	L61	L62	L82	(10)
PGE2FL5HC390	INDUCTOR	L2										(1)
PGE2FL5HC560	INDUCTOR	L44	L51									(2)
PGE2FL5HC680	INDUCTOR	L80										(1)
PGE2FL5HD101	INDUCTOR	L1	L3	L5	L15	L23	L31	L37	L38	L45	L49	
		L58	L60									(12)
PGE2FL5HD221	INDUCTOR	L9	L11	L12	L18	L26	L33	L40	L56	L57	L59	(10)
PGE2FL5HD471	INDUCTOR	L13	L19	L41	L50	L55	L65	L72				(7)
PGE3P0075	INDUCTOR	L8	L43									(2)
PGE3P0086	INDUCTOR	L27	L29	L46	L48	L70	L75	L76				(7)
PGE3P0088	INDUCTOR	L39										(1)
PGE3P1254	INDUCTOR	L34										(1)
PGZ01224-046	DELAY LINE	DL1	DL2									(2)
PGZ01224-047	FILTER	L63	L64	L66								(3)
PGF2AS22AP	SWITCH	SW8	SW9									(2)
PGF3A12JV	SWITCH	SW1	SW2	SW3	SW4	SW5	SW6	SW7				(7)
PGZ01224-048	RELAY	RY1	RY2	RY3	RY4	RY5	RY6					(6)
PGG3B06PSVH	CONNECTOR	CN105										(1)
PGG3PI0213M	CONNECTOR	CN106										(1)
PGZ01166-051	CONNECTOR	CN107	CN108	CN109	CN110							(4)
PGG3PI0216M	CONNECTOR	CN111										(1)
PGG3XJ8A0211	CONNECTOR	JP2	JP5	JP6	JP7	JP12	JP15	JP17				(7)
PGG3XJ8A0311	CONNECTOR	JP2	JP5	JP6	JP7	JP12	JP15	JP17				(7)
PGZ01224-055	CONNECTOR	CN102	CN104									(2)
PGZ01224-054	CONNECTOR	CN101	CN103									(2)
PGZ00587-00	TERMINAL ,BLACK	TP3	TP5	TP7	TP9	TP11	TP13	TP14	TP17	TP18	TP21	
		TP22	TP24	TP28	TP29	TP30						(15)
PGZ00587-03	TERMINAL ,ORANGE	TP1	TP2	TP4	TP6	TP8	TP10	TP12	TP15	TP16	TP19	
		TP20	TP23	TP25	TP26	TP27	TP31	TP32	TP41	TP42	TP43	
		TP44	TP45	TP46	TP47							(24)
PGG6DICF24E2	IC SOCKET	IC5	IC17	IC20								(3)

		(---------------- REF NO									----------------)	
PART NO.	PART NAME, DESCRIPTION	1	2	3	4	5	6	7	8	9	10	
PGG6DICS30CS	IC SOCKET	IC14										(1)
PGG6871803S4	IC SOCKET	IC66	IC76									(2)
PGZ3C081LGB	KNOB, CAP	9	9	9	9							(4)
PGZ3NR10031	KNOB	9	9	9	9							(4)
PGZ00963	CRYSTAL	VCX01										(1)

DIGITAL BOARD ASSEMBLY <05>

PART NO.	PART NAME, DESCRIPTION	1	2	3	4	5	6	7	8	9	10	
PGZ01224-002	DIGITAL BOARD ASSY	PWBA										(1)
PM-2442-1	I C 16V8-25LP	13E										(1)
PM-2443-1	I C 16V8-25LP	11E										(1)
PM-2444	I C 16V8-25LP	10E										(1)
PM-2445	I C 16V8-25LP	5F	9E									(2)
PM-2446	I C 16V8-25LP	6E										(1)
PM-2448	I C 16V8-25LP	16E										(1)
PM-2449	I C 16V8-25LP	17E										(1)
PM-2450-1	I C 16V8-25LP	18E										(1)
PM-2451	I C 16V8-25LP	7E										(1)
PM-2452	I C 16V8-25LP	9H										(1)
PM-2453	I C 16V8-25LP	8H										(1)
PM-2454	I C 16V8-25LP	6H										(1)
PM-2455-1	I C 16V8-25LP	5H										(1)
PM-2456-1	I C 16V8-25LP	8F										(1)
PM-2457	I C 16V8-25LP	7F										(1)
PM-2458	I C 16V8-25LP	7H										(1)
PM-2459	I C 16V8-25LP	14C										(1)
PM-2460	I C 16V8-25LP	13C										(1)
PM-2461	I C 27S21APC	14F										(1)
CX7930A	I C	2B	9C									(2)
SM5828	I C	16F										(1)
SN74221	I C	8B	11B	12B								(3)
SN74LS07	I C	13B										(1)
SN74LS125A	I C	6C										(1)
M5L74LS00	I C	11C										(1)
M5L74LS04	I C	5C	11D									(2)
M5L74LS14P	I C	8D	15D									(2)
M5L74LS86	I C	16H										(1)
M5L74LS123	I C	7C	14D									(2)
M5L74LS163	I C	4E	4F	4H	6F	8E	15E	17B				(7)
M5L74LS221	I C	6D	7D									(2)
M5L74LS374	I C	14E										(1)
74F04	I C	2E										(1)
74F74	I C	12C										(1)
74F244	I C	9F										(1)
74F283	I C	13H	14H									(2)
74AC374	I C	15F										(1)
CD4053B	I C	8M										(1)
TC74HC00AP	I C	13D										(1)
TC74HC14AP	I C	11F										(1)
TC74HC221P	I C	10C	10D									(2)
TC74HC244AP	I C	3C	18F									(2)
TC74HC283AP	I C	15J	16J									(2)
TC74HC374AP	I C	10H	13J	14B	14J	17C	17J	18C	18J			(8)

PART NO.	PART NAME, DESCRIPTION	REF NO										
		1	2	3	4	5	6	7	8	9	10	
AN612	I C	13M	19L									(2)
NE555	I C	18B										(1)
LF353N	I C	7N	9B	10B	15L							(4)
UPC4082C	I C	7M										(1)
UPC1458C	I C	1A										(1)
LM311N	I C	4M										(1)
MC1414P	I C	10N	15N									(2)
TA78L005AP	I C	REG1	REG2									(2)
MC4044P	I C	2D	6B									(2)
CXK1206M	I C	3J	3K	5J	5K	8J	8K	10J	10K			(8)
CXK1202S	I C	11H	17D	18D	18H							(4)
2SA1015GR	TRANSISTOR	Q2	Q6	Q7	Q8	Q10	Q14	Q15	Q17			(8)
2SC1815GR	TRANSISTOR	Q1	Q4	Q5	Q9	Q11	Q12	Q13	Q16	Q18		(9)
2SK192BLA	FET	Q3	Q19									(2)
MV2112	DIODE	D1										(1)
MV2114	DIODE	D3										(1)
05Z6·2Y	DIODE	D13	D16									(2)
1N34A	DIODE	D7	D8	D9	D10	D12						(5)
1S1588	DIODE	D6	D11	D14	D15	D17	D18					(6)
GL-3PG1	LED	LED1	LED2	LED3	LED4							(4)
TLP570	LED	2M	3M									(2)
PGC1CQ92X332	C PLASTIC	C37										(1)
PGC1MC1HX102	C PLASTIC	C59	C74	C77	C81	C158						(5)
PGC1MC1HX222	C PLASTIC	C17	C70	C72	C75	C110						(5)
PGC1MC1HX472	C PLASTIC	C83	C188									(2)
PGC1MC1HY103	C PLASTIC	C8	C10	C16	C20	C21	C57	C67	C209	C210	C211	
		C216	C221	C227	C229							(14)
PGC1MC1HY333	C PLASTIC	C76	C84									(2)
QCZ0214-104	C CERAMIC	C1	C4	C7	C15	C19	C25	C26	C29	C30	C31	
		C32	C34	C35	C38	C39	C45	C46	C52	C53	C54	
		C56	C60	C61	C62	C63	C65	C68	C69	C71	C78	
		C79	C82	C85	C86	C88	C89	C90	C91	C92	C93	
		C94	C95	C96	C97	C98	C99	C100	C101	C102	C104	
		C105	C106	C107	C108	C109	C112	C113	C114	C115	C117	
		C118	C119	C120	C121	C122	C123	C124	C125	C126	C127	
		C128	C129	C130	C131	C132	C133	C134	C135	C136	C139	
		C140	C141	C143	C144	C145	C146	C147	C151	C152	C153	
		C154	C155	C156	C157	C159	C160	C162	C164	C165	C166	
		C168	C169	C172	C178	C179	C181	C182	C185	C186	C190	
		C191	C194	C196	C197	C200	C204	C206	C213	C214	C215	
		C222	C224	C228	C230	C238						(125)
PGC2A3CHC100	C CERAMIC	C184										(1)
PGC2A3CHC150	C CERAMIC	C11										(1)
PGC2A3CHC180	C CERAMIC	C207										(1)
PGC2A3CHC200	C CERAMIC	C195										(1)
PGC2A3CHC220	C CERAMIC	C9	C41	C42	C43	C44						(5)
PGC2A3CHC330	C CERAMIC	C217										(1)
PGC2A3CHC390	C CERAMIC	C14										(1)
PGC2A3CHC820	C CERAMIC	C208										(1)
PGC2A3CHD101	C CERAMIC	C13	C73									(2)
PGC2A3CHD131	C CERAMIC	C58	C202	C212								(3)
PGC2A3CHD221	C CERAMIC	C173										(1)
PGC2A3CHD271	C CERAMIC	C180										(1)
PGC2A3CHD471	C CERAMIC	C176										(1)
PGC2A3CHE102	C CERAMIC	C36	C111									(2)
PGC3TC1VA104	C TA ELYC	C167	C189									(2)
PGC3TC1VB1R0	C TA ELYC	C3										(1)
PGC3TC1VB2R2	C TA ELYC	C55										(1)
PGC3TC1VB4R7	C TA ELYC	C149	C150									(2)

PART NO.	PART NAME, DESCRIPTION	(---------------- REF NO ---------------)										
		1	2	3	4	5	6	7	8	9	10	
QETA0JM-476	C AL ELYC	C64	C218									(2)
QETA0JM-107	C AL ELYC	C27	C87									(2)
QETA1CM-106	C AL ELYC	C28	C232									(2)
QETA1CM-476	C AL ELYC	C6	C161	C225								(3)
QETA1CM-107	C AL ELYC	C138	C142	C148	C177	C187	C192					(6)
QETA1HM-474	C AL ELYC	C22	C40									(2)
QETA1HM-105	C AL ELYC	C33	C199	C219								(3)
PGC51ZW1053	C VARIABLE	VC1										(1)
PGC51ZW2053	C VARIABLE	VC2	VC3									(2)
QRD143J-331	R CARBON	9										(1)
QRD143J-4R7	R CARBON	R129										(1)
QRD143J-100	R CARBON	R97	R144	R163								(3)
QRD143J-220	R CARBON	R107	R149									(2)
QRD143J-680	R CARBON	R120	R146	R158	R171	R184						(5)
QRD143J-750	R CARBON	R108	R151									(2)
QRD143J-101	R CARBON	R50	R54	R134								(3)
QRD143J-201	R CARBON	R156										(1)
QRD143J-221	R CARBON	R7										(1)
QRD143J-331	R CARBON	R38	R40	R42	R44	R81	R90	R91	R104	R105		(9)
QRD143J-471	R CARBON	R114	R116	R127	R140	R147	R175					(6)
QRD143J-561	R CARBON	R24	R92	R93	R121	R176						(5)
QRD143J-621	R CARBON	R46										(1)
QRD143J-751	R CARBON	R30										(1)
QRD143J-821	R CARBON	R112										(1)
QRD143J-911	R CARBON	R183										(1)
QRD143J-102	R CARBON	R17	R27	R29	R36	R37	R61	R68	R79	R94	R100	
		R137	R141	R145	R148	R152	R153	R154	R159	R165	R177	(20)
QRD143J-122	R CARBON	R88	R111	R157								(3)
QRD143J-132	R CARBON	R66										(1)
QRD143J-152	R CARBON	R19	R23	R25	R70	R71	R89					(6)
QRD143J-182	R CARBON	R124										(1)
QRD143J-202	R CARBON	R20	R166	R172	R182							(4)
QRD143J-222	R CARBON	R32	R49	R51	R52	R55	R56	R57	R62	R109	R125	
		R128	R136									(12)
QRD143J-272	R CARBON	R110	R161	R169								(3)
QRD143J-302	R CARBON	R9	R167									(2)
QRD143J-332	R CARBON	R65	R119	R123	R150	R155	R174					(6)
QRD143J-362	R CARBON	R34										(1)
QRD143J-392	R CARBON	R26	R72	R132	R133							(4)
QRD143J-472	R CARBON	R6	R96	R103								(3)
QRD143J-512	R CARBON	R18	R31	R126	R173							(4)
QRD143J-562	R CARBON	R131										(1)
QRD143J-682	R CARBON	R10	R80	R160								(3)
QRD143J-752	R CARBON	R21										(1)
QRD143J-822	R CARBON	R98										(1)
QRD143J-912	R CARBON	R78										(1)
QRD143J-103	R CARBON	R1	R2	R3	R4	R11	R12	R22	R28	R33	R39	
		R41	R43	R45	R53	R67	R69	R74	R87	R95	R106	
		R113	R115	R117								(23)
QRD143J-153	R CARBON	R35	R77	R83	R85							(4)
QRD143J-203	R CARBON	R73										(1)
QRD143J-223	R CARBON	R138	R139									(2)
QRD143J-303	R CARBON	R101										(1)
QRD143J-333	R CARBON	R76	R84									(2)

		REF NO										
PART NO.	PART NAME, DESCRIPTION	1	2	3	4	5	6	7	8	9	10	
QRD143J-363	R CARBON	R47	R48	R178								(3)
QRD143J-393	R CARBON	R162										(1)
QRD143J-473	R CARBON	R63	R82									(2)
QRD143J-563	R CARBON	R13	R75									(2)
QRD143J-683	R CARBON	R102										(1)
QRD143J-753	R CARBON	9										(1)
QRD143J-913	R CARBON	R179										(1)
QRD143J-104	R CARBON	R5	R14	R15	R118	R143	R164	R168				(7)
QRD143J-154	R CARBON	R170										(1)
QRD143J-204	R CARBON	R99										(1)
QRD143J-105	R CARBON	R8	R16	R64								(3)
PGD3AU4JF103	R ARRAY	RA1	RA2									(2)
PGD3AU8JF103	R ARRAY	RA4										(1)
PGD4C20PE502	R VARIABLE	VR2	VR3	VR4								(3)
PGD4C6PE502	R VARIABLE	VR7	VR8	VR9	VR10	VR12						(5)
PGD4C6PF103	R VARIABLE	VR5	VR14									(2)
PGD4C6PF503	R VARIABLE	VR11										(1)
PGD4C6XE502	R VARIABLE	VR1	VR6									(2)
PGE1EP111500	TRANSFORMER	T1										(1)
PGE2FL4HB4R7	INDUCTOR	L4										(1)
PGE2FL5HC390	INDUCTOR	L8										(1)
PGE2FL5HC680	INDUCTOR	L9										(1)
PGE2FL5HD101	INDUCTOR	L5										(1)
PGE3P0075	INDUCTOR	L7										(1)
PGE3P0088	INDUCTOR	L6										(1)
PGE5BSZBF503	FILTER	L1	L2	L3								(3)
PGF0DNT04	SWITCH	SW2										(1)
PGF0DSS107	SWITCH	SW9										(1)
PGF3A12JH	SWITCH	SW1										(1)
PGF5S1011	SWITCH	SW3										(1)
PGF6AB15AV	SWITCH	SW4	SW5	SW6	SW7							(4)
PGF6AT475R	SWITCH , RED	SW4	SW5	SW6	SW7							(4)
PGG3B06PSVH	CONNECTOR	CN205										(1)
PGG3PI0213M	CONNECTOR	CN207										(1)
PGZ01166-051	CONNECTOR	CN209										(1)
PGG3PI0216M	CONNECTOR	CN206	CN208									(2)
PGG3XJ8A0211	CONNECTOR	JP2										(1)
PGG3XJ8C0211	CONNECTOR	JP6										(1)
PGG3XJ8D0311	CONNECTOR	JP2										(1)
PGZ01224-055	CONNECTOR	CN202	CN204									(2)
PGZ01224-054	CONNECTOR	CN201	CN203									(2)
PGZ00587-00	TERMINAL , BLACK	TP1	TP3	TP4	TP5	TP19						(5)
PGZ00587-03	TERMINAL , ORANGE	TP2	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	(22)
		TP15	TP16	TP17	TP18	TP20	TP21	TP22	TP23	TP24	TP25	
		TP26	TP27									
PGG6871603S4	IC SOCKET	14F										(1)
PGG6872003S4	IC SOCKET	5F	5H	6E	6H	7E	7F	7H	8F	8H	9E	(19)
		9H	10E	11E	13C	13E	14C	16E	17E	18E		
PGZ00549	CRYSTAL	X4										(1)
PGZ01224-052	CRYSTAL	X2										(1)
PGZ01224-053	CRYSTAL	X1										(1)